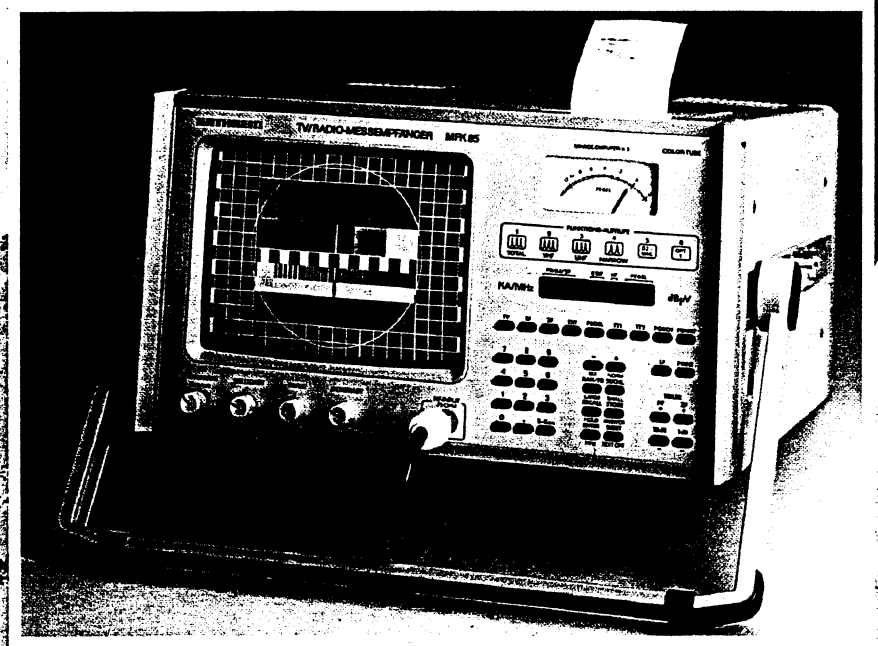
Service Manual

TV/Radio-Signal Meter MFK 85



KATHREIN

Antennen · Electronic

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-KEY BOARD

-PRINTER

-SCART SOCKET

-LIST OF SPARE PARTS

RECOMMENDATION FOR SERVICE REPAIRS

- Use only original spare parts.

- Use only original fuse value.

- Safety compliance, parts of the product must not be visually damaged or unsuitable. This is valid especially for insulators and insulating parts.

- Mains leads and connecting leads should be checked for external damage before connection. Check the insulation!

- The functial safety of the tension relief and bending protection bushes are to be checked.

- Thermally loaded solder pads are to be suck off and re-soldered

- Ensure that the ventillation slots are not obstructed.

- No repairs or modifications should be attempted on the RF dividor, tuner and maesurement amplifier, since they could have an adverse effect on the subsequent measurement accuracy.

- After repairing measurment accuracy as well every function of the level strength meter must be checked and if required the unit must be re-calibrated.

- Re-calibration can only be executed with the computer calibration program of MFK55/85 via interface RS232 from Kathrein.
  It is available at: Fa.Katek
  Postfach 1220
  83220 Grassau
  Germany

HANDLING OF MOS CHIP COMPONENTS

MOS circuits require special attention with regard to static charges.
Static charges may occur with any highly insulating plastics and can be transferred to persons wearing clothes and shoes made of synthetic materials.Protective circuits on the inputs and outputs of MOS circuits give protection to a limited extend only due to the time of reaction.Please observe the following instructions to protect the components against damages from static charges:

1. Keep MOS components in conductive packages until they are used. MOS components must never be stored or transported in Styropor materials or plastic magazines.

2. Persons have to rid themselves of electrostatic charges by touching a grounded object before handling MOS components.

3. Take the chip by the body without touching the terminals.

4. Use only grounded instruments for testing and processing purposes.

5. Remove or connect MOS IC's with in mounting sockets only if the operating voltage is disconnected.

6. The circuits of p-channel MOS components must not be connected to positive voltages (with reference to bulk VVS).

MOS SOLDERING INSTRUCTIONS

- Use only mains isolated low-voltage soldering irons.

- Maximum soldering period 5 seconds at a soldering iron temperature
  of 300 to 400 degrees Celsius.

SAFETY STANDARD COMPLIANCE

After service work the insulating resistance and the leakage current with the product switch on must be checked according to VDE 0701 or to the specification valid at the installation location! This product conforms to the Safety Class I.

Measurement of the insulation Resistance to VDE 0701

Connect an Insulation Meter (UTest=500V-) to both mains poles simultanecously and between all cabinet or functional parts (antenna, sockets, buttons, decorative parts, etc.) made from metal or metal alloy. The product is fault free if:

Risol > 2 Mohm at UTest=500 V-
Measuring time: > 1 s

Measurement of the Leakage Current to VDE 0701

Connect the Leakage Current Meter (UTest=220V~) to both mains poles simultaneously and between all cabinet parts made from metal or metal alloy. The product is fault free if:

I-LEAK < 1 mA at U-TEST = 220 V~
Measuring time: > 1 s

Measurement of the safety earth resistance

Measure the resistance betweeen main plug safety earth and all cabinet parts made from metal. Te product is fault free if:

Resistance < 0,1 Ohm

If the safety of the product is not proved, because

- a repair and restoration is impossible
- or the request of the user is that the restoration is not be carried out the operator of the product must be warned of the danger by a written warning.

SERVICE INSTRUCTION

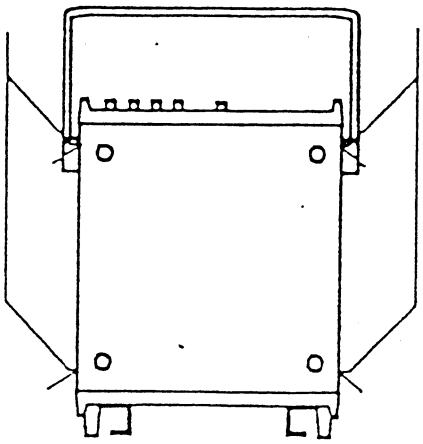
Removing the cabinet part

Cabinet upper part

-Remove 4 screws on the left and right hand side
-Lift off the cabinet upper part

Cabinet lower part

-Remove 4 screws on the left and right hand side
-Lift off the cabinet lower part

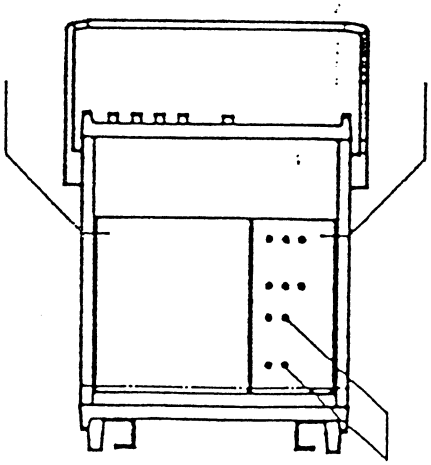


Rear panel

-Remove the black feet on the rear panel
-Hinge out the rear panel by pulling on the plastic loops
-Release plug and socket connection and remove rear panel

Service position

-Remove 2 screws at the left and right top side of the metal chassis frame and take out the main chassis board



Before takeing out a module remove assembly screws.

SERVICE INSTRUCTION

Removing the cabinet part

Cabinet upper part

-Remove 4 screws on the left and right hand side
-Lift off the cabinet upper part

Cabinet lower part

-Remove 4 screws on the left and right hand side
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Rear panel

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Service position

-Remove 2 screws at the left and right top side of the metal chassis frame and take out the main chassis board

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1. Technical specifications MFK 85

The MFK 85 is a selective TV-Radio Signal Meter with colour picture tube, printer and graphic controller in portable form. It can carry out, print out or display level measurements, picture and sound quality assessements and provide panorama displays. The instrument is controlled by means of a keyboard with 35 keys.

Dimensions:	W 365 mm, H 205 mm, D 425 mm, lid 30 mm
Battery operating mode:	Nickel-cadmium cells (10 x 1.25 V) (batteries not included in scope of delivery), built-in charging unit, deep-discharge protection, switch-over from battery op. mode to charging, battery operation approx. 1.5 hr
Battery check:	LCD display (operates at power-up and while "RESET" key is pressed). "ACCU (-----)" (20, 40, 60, 80, 100%)
Picture tube:	9" colour CRT Screen size 155 x 114 mm Dot size 0.28 mm Deflection angle 70°
Printer:	EPSON Model 180 24 characters/line and graphics Ribbon EPSON ERC-90, black Normal paper: Woodfree W 57 mm, L max. 62 mm
Dynamic:	FM > 40 dB AM > 50 dB
Image frequency:	FM > 68 dB AM > 50 dB
Reception principle:	TV superheterodyne receiver. VHF/UHF tuner with special channel and extended special channel band. TV-IF amplifier with surface acoustic wave filter (quasi-parallel sound technique). Sound-IF amplifier with ceramic filter and FM demodulation. Radio FM super-heterodyne receiver FM 8 circuits and 1 ceramic filter. AM dual superheterodyne receiver, 7 circuits and 2 ceramic filters.
Demagnetization:	Automatic Demagnetization also functions in the battery mode (series oscillating circuit)
Euronorm sockets: (SCART socket)	Composite colour signal input Composite colour signal output RGB input RGB switching voltage 1-3 V on contact 16

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Colour section:	Rise time: PAL 600 ns; SECAM 30 % 600 ns Automatic PAL/SECAM recognition
Television frequency bands:	VHF and UHF: 47 ... 867.20 MHz Tuner ranges: 47 ... 115.7 MHz 115.75 ... 297.7 MHz 297.75 ... 427.20 MHz 427.25 ... 867.20 MHz IF 38.90 MHz (OIRT 38.00 MHz, FR 38.9 MHz)
Television standards:	CCIR system B, G and H 625 lines, 25 full pictures/sec RF picture carrier amplitude modulated Vestigial sideband technique (A5, negative) RF sound carrier frequency modulated (F3) In I and D/K systems only picture carrier measurement and picture check possible. With option for systems I and D/K sound carrier measurements and sound check also possible.
Freq. measurement:	Indirect through frequency setting
Frequency spacing:	TV 50 kHz; radio FM 25 kHz; AM 1 kHz
Housing:	Aluminium with plastic sheathing, with hinged carrying handle, standing feet and front cover.
Weight:	13.5 kg with front cover 14.5 kg with nickel-cadmium batteries
Graphic controller:	512 x 256 dots, monochrome
RF proofness:	TV for E = 1 V/m indication, UHF < 5 µV VHF (47 ... 470 MHz) < 2 µV Radio FM < 5 µV, AM < 2 µV
RF input:	IEC socket, 75 Ohm TV/Radio and IF with isolating capacitor RF max. 132 dBµV, DC 100 V
RF input divider:	RF divider loss (max. 70 dB) 10 dB, 20 dB, 40 dB
Horizontal deflection:	HT voltage 17 kV at 0.3 mA Focussing voltage 4 kV, diode split +X'X
Headphone connection:	Stereo jack-plug, 3.5 mm (stereo in radio mode only)
LCD display:	16-digit LCD indicator for channel, frequency, customer data memory, status, RF divider, battery and level

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Measuring range:	TV 30 ... 132 dBµV Radio 20 ... 122 dBµV IF-TV/Radio 60 ... 132 dBµV
Measuring accuracy:	TV<±2 dB, radio FM/AM<±2 dB at + 23 °C, input divider 10 dB
Measurement amplifier:	Selective measurement amplifier with Sample and Hold on TV and mean value indicator for radio and peak value measurement on graphic. TV-IF 38.9 MHz (38.0 MHz with OIRT) Radio-IF 10.7 MHz Bandwidths (-3 dB) 1 MHz with TV picture carrier and graphic (TOTAL, VHF and UHF) 200 kHz with TV sound carrier, FM radio and graphic (NARROW and FM) 9 kHz for AM radio
Microcomputer:	8 Bit microcomputer SAB 80535 up to 64 kByte EPROM, 2 kByte RAM
Mains power supply:	195 - 245 Volt, 50 - 60 Hz TV 43 VA, radio 8 VA
Power supply unit:	Power supply unit 220 V, 50 Hz - 16 V DC Transformer protection category I (all accessible conductive parts linked to non-fused protective earth). Switching mode power supply unit switching frequency 40 kHz, 5 V / 12 V / 33 V Efficiency 85 % Switching elements not needed for actual measuring operation are isolated (extends operating time in the battery mode). Switching mode power supply unit for sweep components 27 V synchronized by line sweep. Efficiency $\geq$ 85 %
Options:	Videotext decoder / Teletext decoder VPS (only in conjunction with Videotext) D2-MAC decoder RS 232 interface Standard I or L or D/K
Oscillator interference voltage:	TV < 46 dBµV, radio< 20 dBµV
Level display:	Digital: 0 ... 132 dBµV on TV 0 ... 122 dBµV on radio Analogue: Relative 18 dB

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Level measurement:	TV CCIR Standard sync pulse or porch (porch for over-modulation control) TV FR standard porch Radio FM signal level, AM signal level with modulation (AM mean value) Panorama display peak value measurement
Radio frequency ranges:	AM-LW/MW 0.150 ... 1.650 MHz SW 5.900 ... 6.500 MHz FM-VHF 87.00 ... 108.00 MHz FM-IF 10.70 MHz
Return loss:	TV > 14 dB, radio > 18 dB (HF divider 10 dB)
Signal section:	Contrast 50 Vpp Frequency response 5 MHz -3 dB Brightness: Voltage deviation 50 V Rise time 110 ns
Stereo decoder (radio):	PLL decoder, stereo indicator in display
Synchronization:	Pulse clipping Line oscillator Super sandbox Phase comparison
Temperature range:	Full functional range 0 °C to +40 °C -10°C level correction TV -3dB, radio -3dB +40°C level correction TV +2dB, radio +2dB
Sound carrier measurement:	All sound carrier measurements, except at end of band (S2, ES34, E68) are possible within the TV frequency bands with keys "TT1", "TT2" (internal standard switch-over 5.5, 5.75, 6, 6.5 MHz), or directly through frequency input.
Sound reproduction:	Loudspeaker mono, 1.5 W Headphones $\geq$ 8 Ohm 1.5 W (stereo radio)
Vertical deflection:	With picture width and height compensation
Video inputs/outputs:	BNC socket: D2-MAC SCART sockets: Composite colour signal input / output RGB input RGB switching voltage 1-3 V on contact 16
IF divider:	IF divider loss 0 ... 24 dB in 0.5 dB steps
Accessories:	Measurement cable 75 Ohm Adapter 75 Ohm BNC-IEC

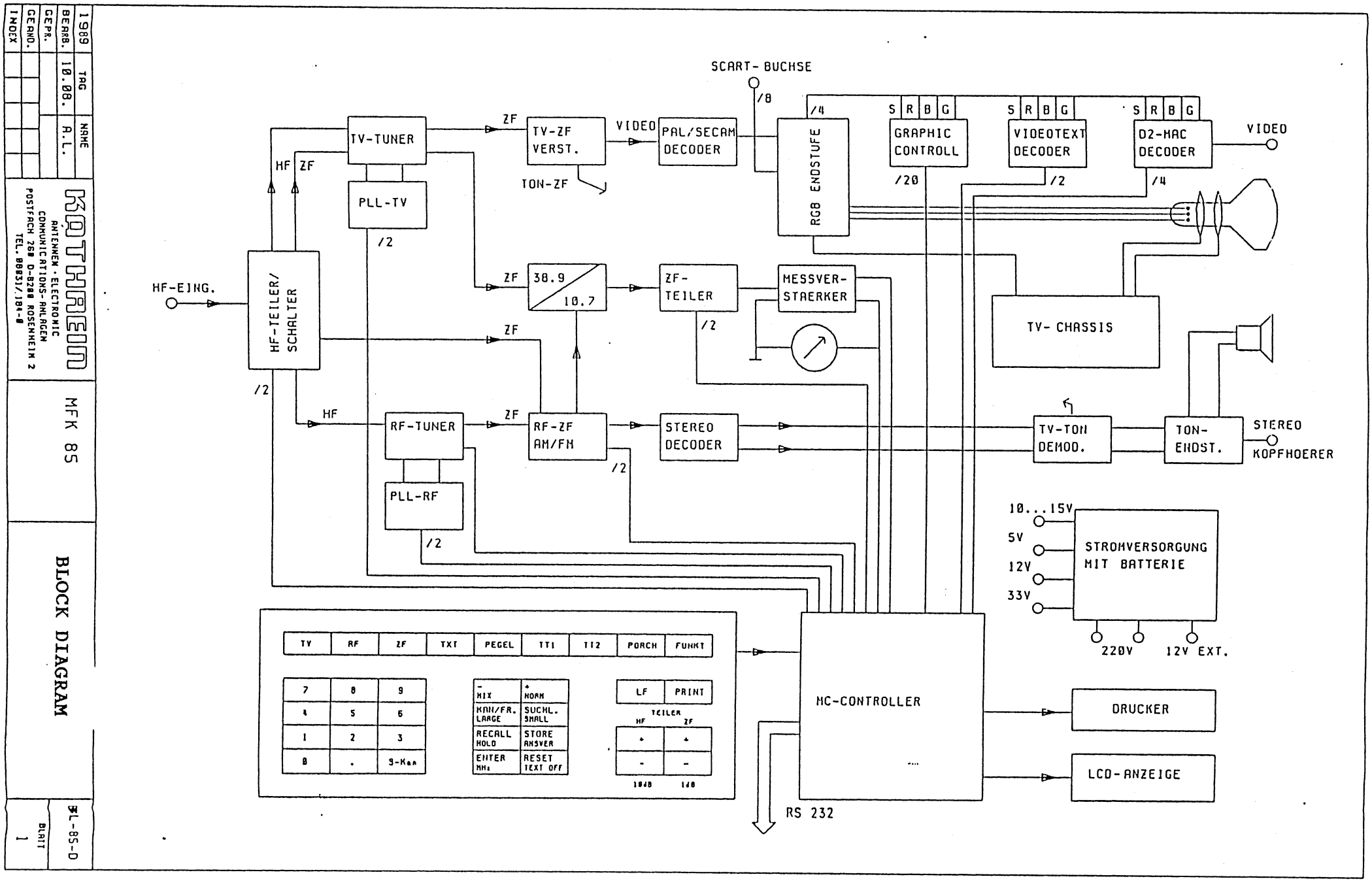
Technical Data

Type			MFK 85						
No.			208235	208207	208225	208213	208211	208226	208212
CCIR-Standard			B + G + H[1])			OIRT B + G + D + K	France B + G + L		England B + G + I
Option[2]) (integrated)	videotext		●	●	●	●	●	–	●
	D2 Mac decoder		●	–	–	–	–	●	–
	AM-VSB-demodulator		●	–	–	–	–	●	–
	RS 232 interface		●	●	●	●	●	●	–
Menue[3])			d	d	e	e	f	f	e
Reception range TV	IF	MHz	47-862 VC 38,9 AC_1 33,4 FM AC_2 33,158 FM			47-862 VC 38,0 AC_1 31,5 FM AC_2 32,5 FM	47-862 VC 38,9 AC_1 33,4 FM AC_2 32,4 AM		47-862 VC 38,9 AC_1 32,9 FM AC_2 33,4 FM
	video		●			●	●		●
Reception range Radio	AM	MHz	0,15-1,65			0,15-1,65	0,15-1,65		0,15-1,65
	FM		5,9-6,5 87-108			5,9-6,5 64-75 + 87-108	5,9-6,5 87-108		5,9-6,5 87-108
	IF		10,7			10,7	10,7		10,7
Measuring dyn.	TV	dBµV	30-132						
	Radio		20-122						
	IF		68-132						
Measurement precision		dB	< ± 2 (23°C)						
Dimensions		mm	W 365 / H 236 / D 425 / Cover 30						
Weight with/without batteries		kg	13,5 / 14,5						

[1]) on CCIR standard I and D + K measurement of video carrier and picture assessment are possible.
[2]) further models with integrated options on request.
[3]) d = German, e = English, f = French

Options

- ● video text decoder.
- ● D2 MAC decoder with own video input for video assessment in combination with MSK 21.
- ● AM – vestigial side band demodulator (for cable processed D2 MAC).
- ● RS 232 Interface (with demonstration soft-ware).
- ● soft-ware packet for computer controlling (in preparation).



INDEX	GEAND.	GEPR.	BEARB.	TAG	NAME
			10.08.		A.L.

1989

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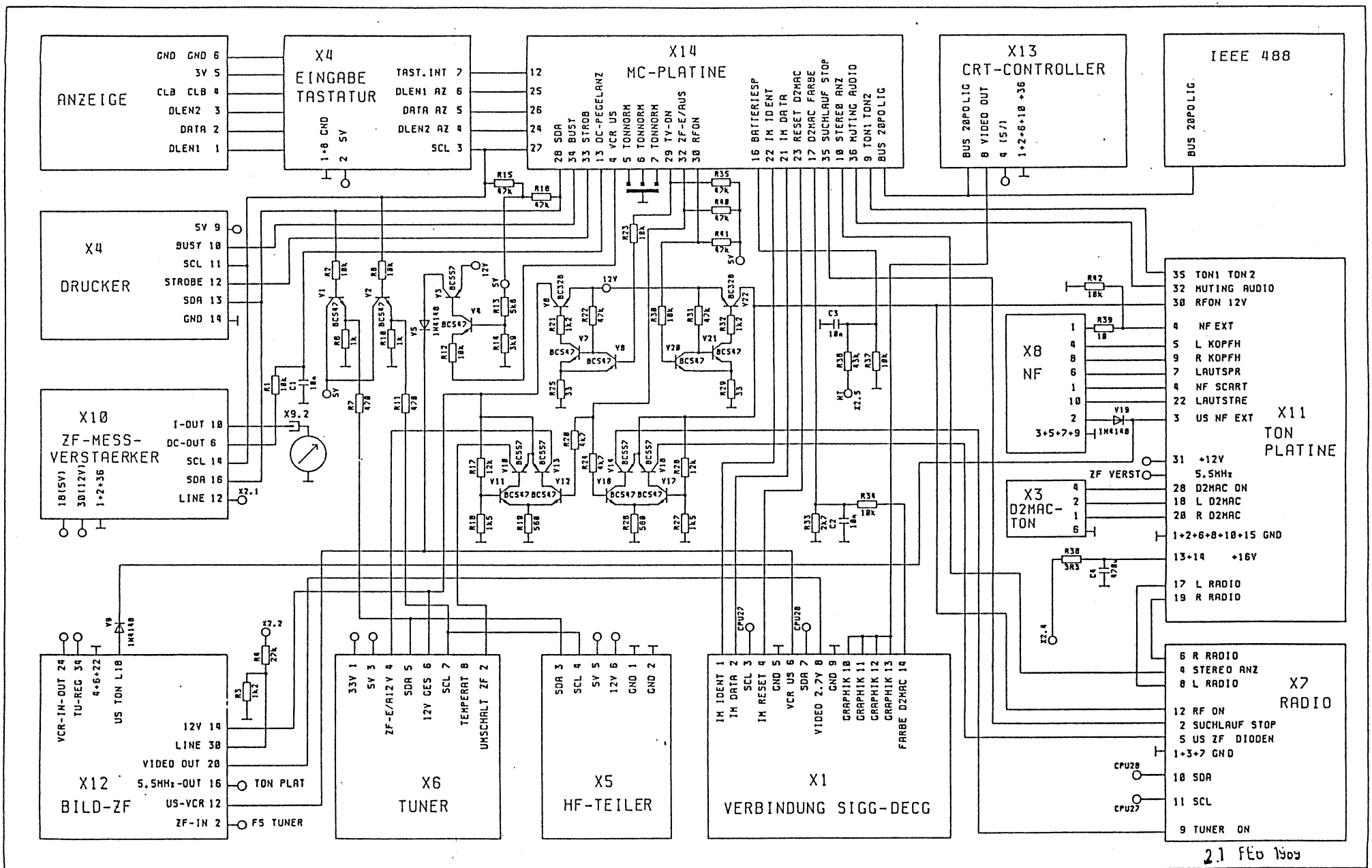
COMMUNICATIONS- ANLAGEN
POSTFACH 260 D-8200 ROSENHEIM 2
TEL. 08031/184-0

MFK 85

BLOCK DIAGRAM

BL-85-D

BLATT 1


ANZEIGE
GND GND 6
3V 5
CLB CLB 4
DLEN2 3
DATA 2
DLEN1 1
X4
EINGABE
TASTATUR
TAST.INT 7
DLEN1 AZ 6
DATA AZ 5
DLEN2 AZ 4
SCL 3
1+8 GND
2 5V
X14
MC-PLATINE
12
25
26
24
27
28 SDA
34 BUSY
33 STROB
13 DC-PEGELANZ
4 VCR US
5 TONNORM
6 TONNORM
7 TONNORM
29 TY-ON
32 ZF-E/AUS
30 RFON
16 BATTERIESP
22 IM IDENT
21 IM DATA
23 RESET D2MAC
17 D2MAC FARBE
35 SUCHLAUF STOP
10 STEREO ANZ
36 MUTING AUDIO
9 TON1 TON2
BUS 28POLIG
X13
CRT-CONTROLLER
BUS 28POLIG
8 VIDEO OUT
4 (5/)
1+2+6+10 +36
IEEE 488
BUS 28POLIG
X4
DRUCKER
5V 9
BUSY 10
SCL 11
STROBE 12
SDA 13
GND 14
X10
ZF-MESS-
VERSTAERKER
18(5V)
30(12V)
1+2+36
I-OUT 10
DC-OUT 6
SCL 14
SDA 16
LINE 12
X2.1
X9.2
X8
NF
1
4
8
6
1
10
2
3+5+7+9
35 TON1 TON2
32 MUTING AUDIO
30 RFON 12V
4 NF EXT
5 L KOPFH
9 R KOPFH
7 LAUTSPR
4 NF SCART
22 LAUTSTAE
3 US NF EXT
X11
TON
PLATINE
31 +12V
5,5MHz
ZF VERST
28 D2MAC ON
18 L D2MAC
20 R D2MAC
1+2+6+8+10+15 GND
13+14 +16V
17 L RADIO
19 R RADIO
X3
D2MAC-
TON
4
2
1
6
X2.4
X12
BILD-ZF
VCR-IN-OUT 24
TU-REG 34
4+6+22
US TON L18
12V 14
LINE 30
VIDEO OUT 20
5.5MHz-OUT 16
TON PLAT
US-VCR 12
ZF-IN 2
FS TUNER
X2.2
X6
TUNER
33V 1
5V 3
ZF-E/A12V 4
SDA 5
12V GES 6
SCL 7
TEMPERAT 8
UMSCHALT ZF 2
X5
HF-TEILER
SDA 3
SCL 4
5V 5
12V 6
GND 1
GND 2
X1
VERBINDUNG SIGG-DECG
IM IDENT 1
IM DATA 2
SCL 3
IM RESET 4
GND 5
VCR US 6
SDA 7
VIDEO 2,7V 8
GND 9
GRAPHIK 10
GRAPHIK 11
GRAPHIK 12
GRAPHIK 13
FARBE D2MAC 14
CPU27
CPU28
X7
RADIO
6 R RADIO
4 STEREO ANZ
8 L RADIO
12 RF ON
2 SUCHLAUF STOP
5 US ZF DIODEN
1+3+7 GND
10 SDA
11 SCL
9 TUNER ON
21 Feb 1989
1989 TAG NAME
BEARB. 31.01 KOLLER
GEPR.
GEAND. KO
INDEX
KATHREIN
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COMMUNICATIONS - ANLAGEN
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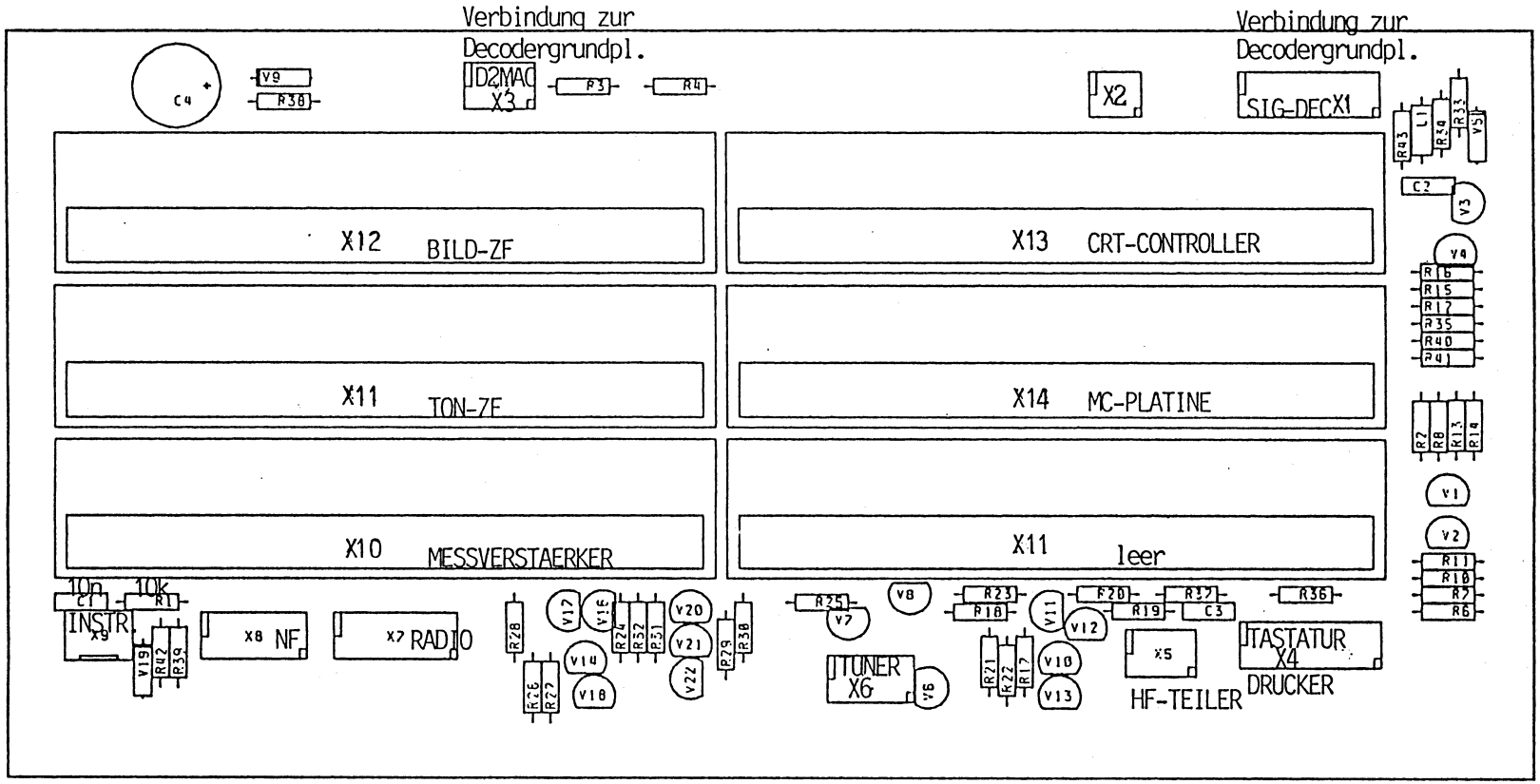
MFK 85
SIGNAL MOTHER BOARD



SIGA-L

	1900	DATUM	NAME	BESTUECKUNGSPLAN BAUTEILSEITE	SIGNAL MOTHER BOARD
	BEARB.	02.08	KOLLER		
	GEPR.				
	INDEX	1349/89	"A"		

KATEK GMBH
BAHNHOFSTR. 108
O-8217 GRASSAU

MASSTAB	BLATT
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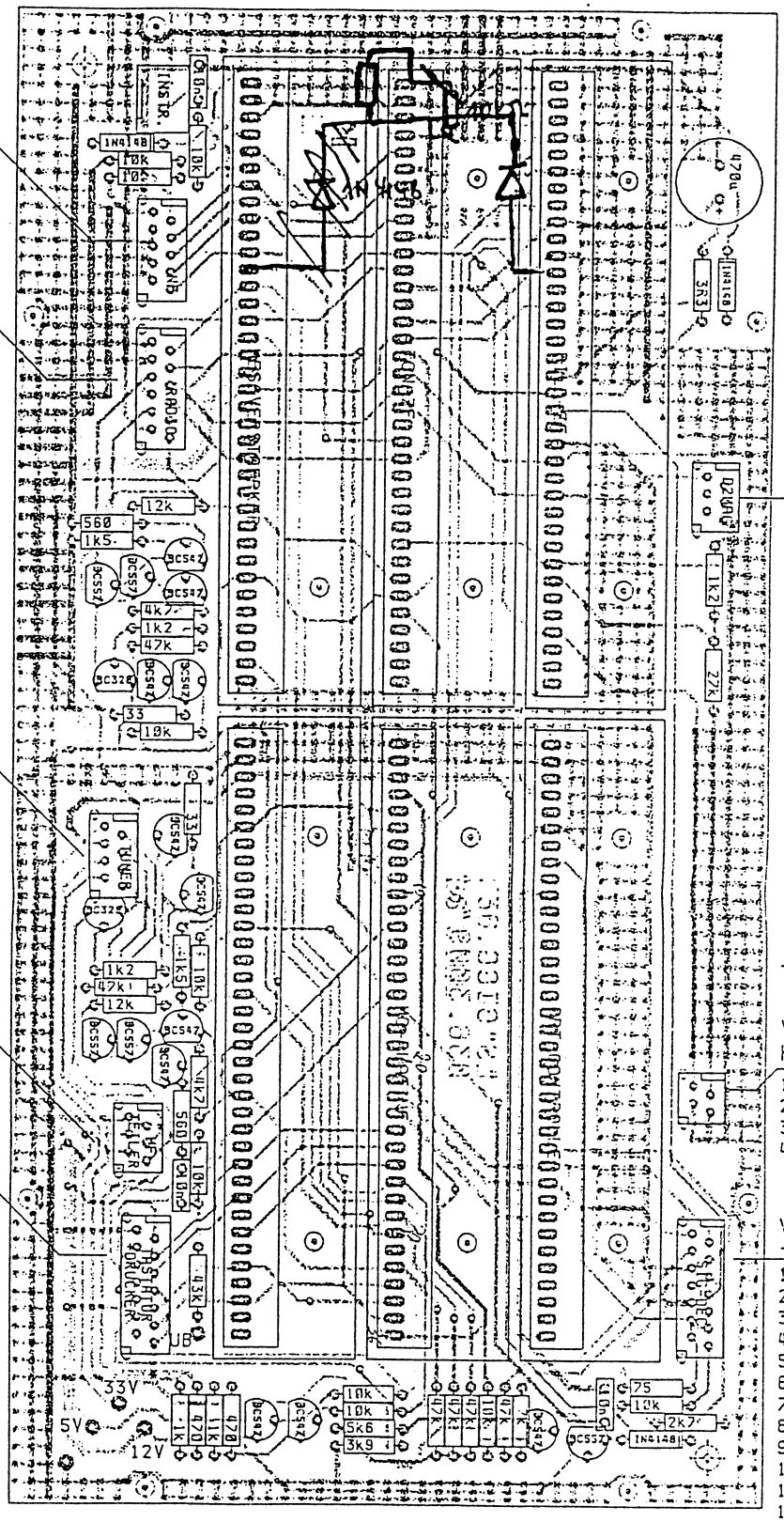
SIGNAL MOTHER BOARD



TUNSTECK
1 NF EXT
2 US SCART
3 MASSE
4 LAUTSP
5 MASSE
6 KH LINKS
7 MASSE
8 KH RECHTS
9 MASSE
10 LAUTSTAERKE

RADIO
1 MASSE
2 SUCHLAUF STOP
3 MASSE
4 STEREO ANZEIGE
5 US ZF EXT
6 NF RECHTS
7 MASSE
8 NF LINKS
9 TUNER ON
10 SDA
11 SCL
12 RF ON

TUNER
1 +33V
2 ZF EXT
3 +5V
4 ZF E/A 12V
5 SDA
6 +12V
7 SCL
8 TEMPERATUR

HF-TEILER
1 MASSE
2 MASSE
3 SDA
4 SCL
5 +5V
6 +12V

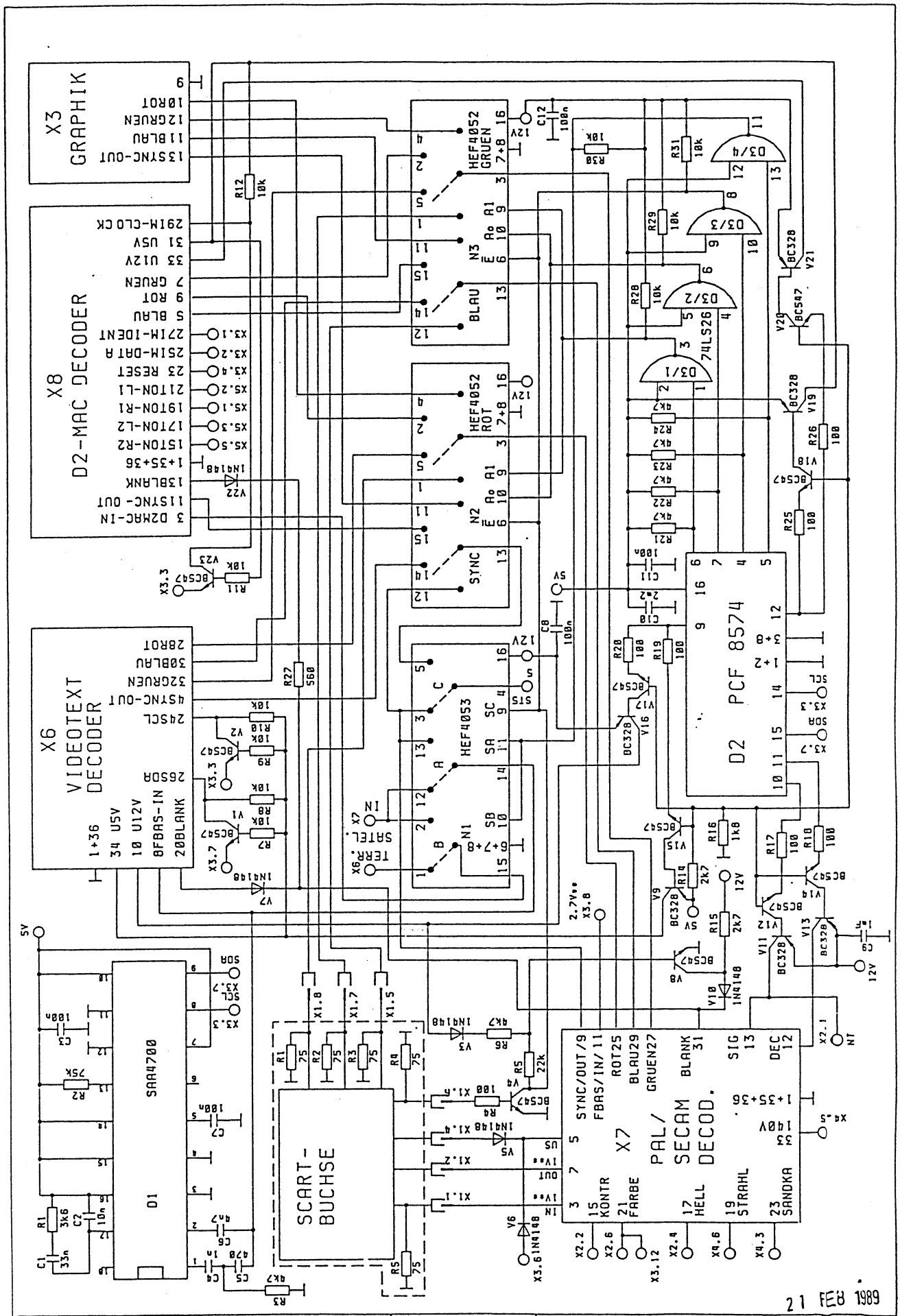
TASTATUR/DRUCK
1 MASSE
2 +5V
3 SCL
4 DLEN2 ANZ.
5 DATA ANZ.
6 DLEN1
7 TAST. INTERR.
8 MASSE
9 +5V
10 BUSY
11 SCL
12 STROB
13 SDA
14 MASSE

DRUCK

D2MAC-TON
1 RECHTS 1
2 LINKS 1
3 FREI
4 US 5V
5 FREI
6 MASSE

VERB.SIGG KIPPTEIL
1 IMP MESSV
2 IMP ZF
3 MASSE
4 MASSE

VERB.DECC -SIGG
1 IM IDENT
2 IM DATA
3 SCL
4 RESET
5 MASSE
6 US VID
7 SDA
8 2.7V VID
9 MASSE
10 GRAPH
11 GRAPH
12 GRAPH
13 GRAPH
14 FARBE D2MAC


X3 GRAPHIK
X8 D2-MAC DECODER
X6 VIDEOTEXT DECODER
D2 PCF 8574
HEF4052 GRUEN
HEF4052 ROT
HEF4053
SYNC
74LS26
SAA4700
D1
SCART-BUCHSE
X7 PAL/ SECAM DECOD.
SYNC/OUT/9
FBAS/IN/11
ROT25
BLAU29
GRUEN27
BLANK 31
SIG 13
DEC 12
HELL
FARBE
KONTR
STRAHL
SANDKA
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DECODER MOTHER BOARD
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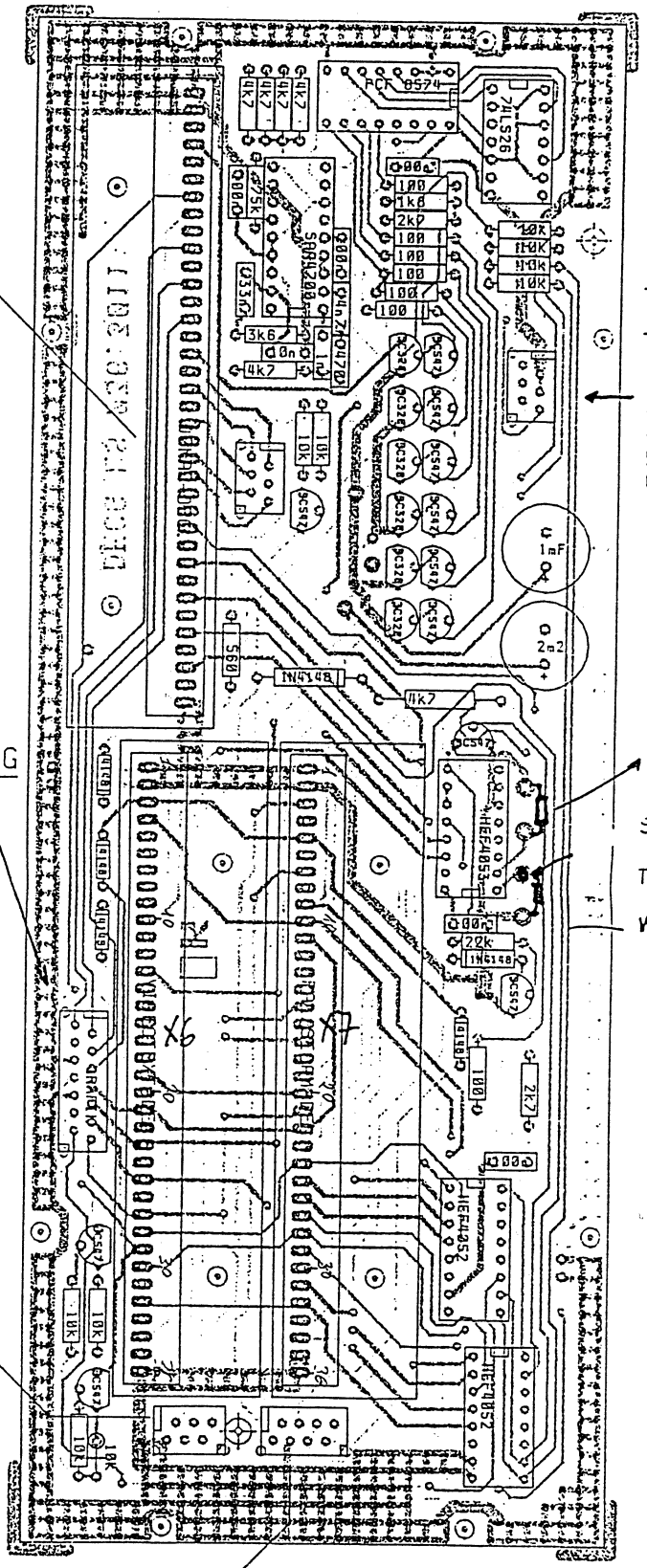
DECODER MOTHER BOARD



X8 D2MAC-TON

1 RECHTS 1
2 LINKS 1
3 LINKS 2
4 US 5V
5 RECHTS 2
6 MASSE

VERB.DECG/SIGG

1 IM IDENT
2 IM DATA
3 SCL
4 RESET
5 MASSE
6 US VID
7 SDA
8 2.7V VIDEO
9 MASSE
10 GRA ROT
11 GRA BLAU
12 GRA GRUEN
13 GRA SYNC
14 FARBE D2MAC

BEDIENT.

1 MASSE
2 KONTR.
3 FREI
4 HELLIG
5 +12V
6 FARBE

SCART ST

1 1V EING
2 1V AUSG
3 MASSE
4 US VID
5 BLAU
6 BLANK
7 GRUEN
8 ROT

VERB.DECG
KIPPTEIL

1 SYNC
2 MASSE
3 SANDKA
4 MASSE
5 140V
6 STRAHLSTROM

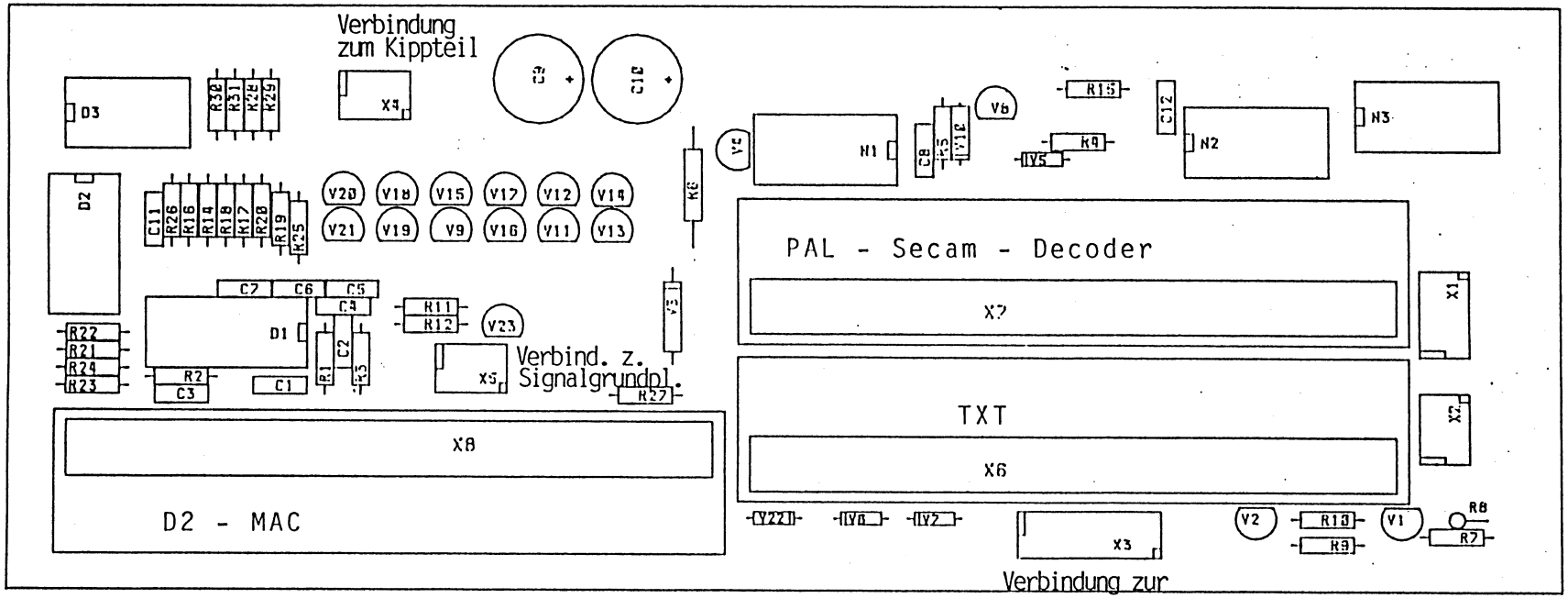
75Ω

SATELLIT

TERRESTRISCH

widerstand

150Ω



DECG-L

	1988	DATUM	NAME
	BEARB.	14.10	KOLLER
	GEPR.		

BESTUECKUNGSPLAN

DECODER MOTHER BOARD

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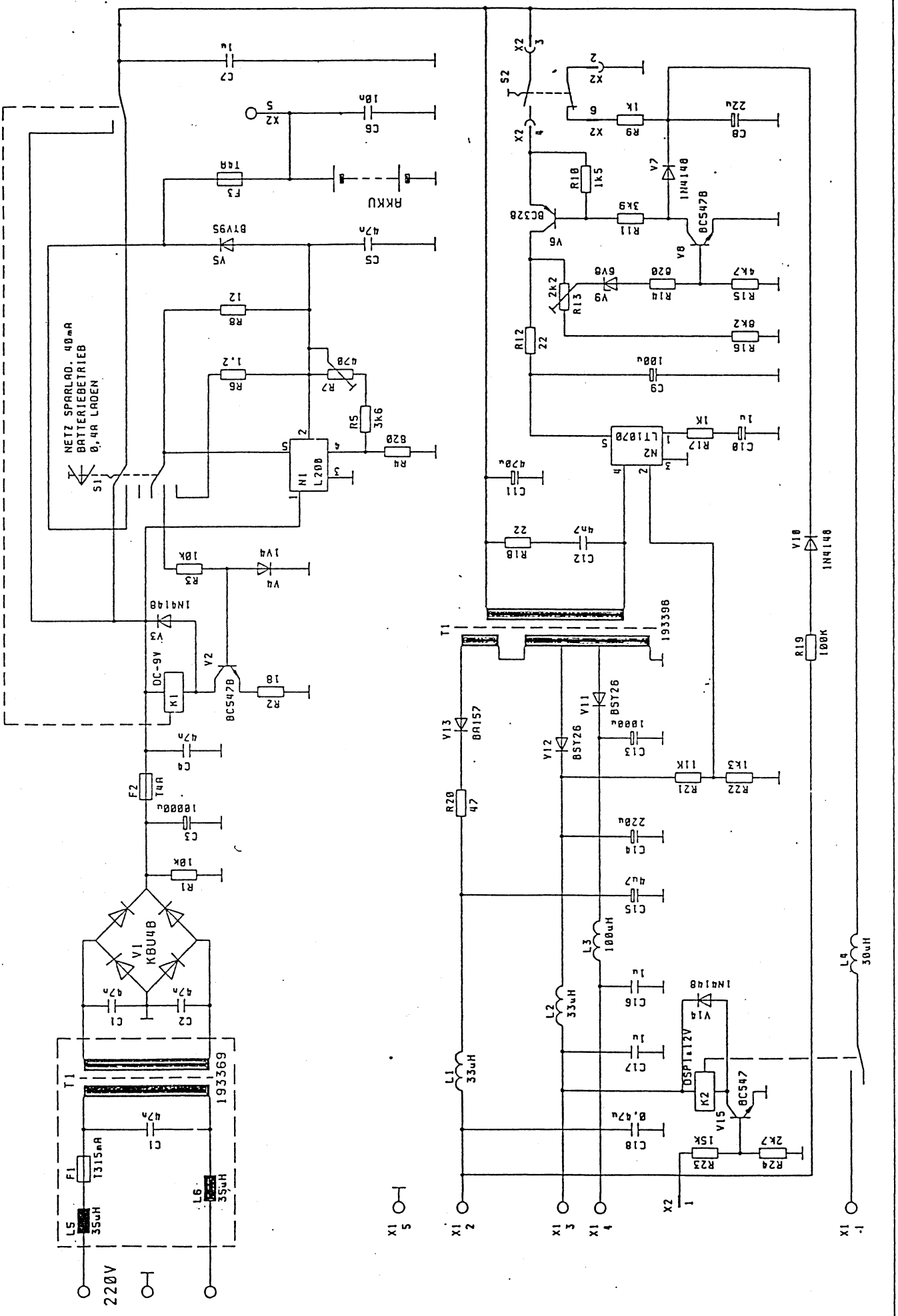
MASSTAB	BLATT
1:1	6



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BEARB.	21.08	KOLLER
GEPR.		
GEAND.		
INDEX		

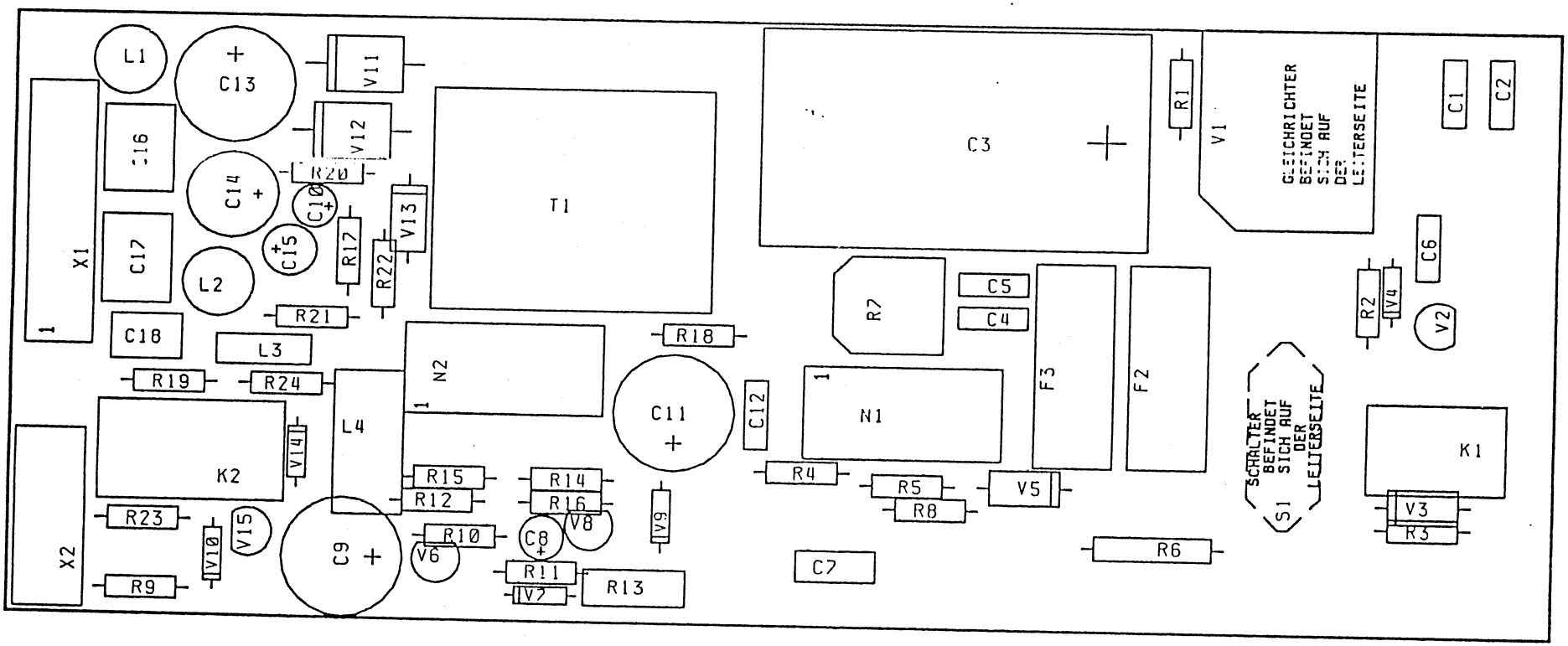
KATHREIN
ANTENNEN · ELECTRONIC
COMMUNICATIONS-ANLAGEN
POSTFACH 260 D-8200 ROSENHEIM 2
TEL. 08031/184-0

MFK85

POWER SUPPLY

NT85-0

BLATT 1



	1989	DATUM	NAME	BESTUECKUNGSPLAN	NETZTEILP[illegible] MFK85
	BEARB.	15.09.	KOLLER		
	GEPR.				
	INDEX				

NT85-L

KATEK GMBH
BAHNHOFSTR. 108
D-8217 GRASSAU

MASSTAB	BLATT
2:1	4

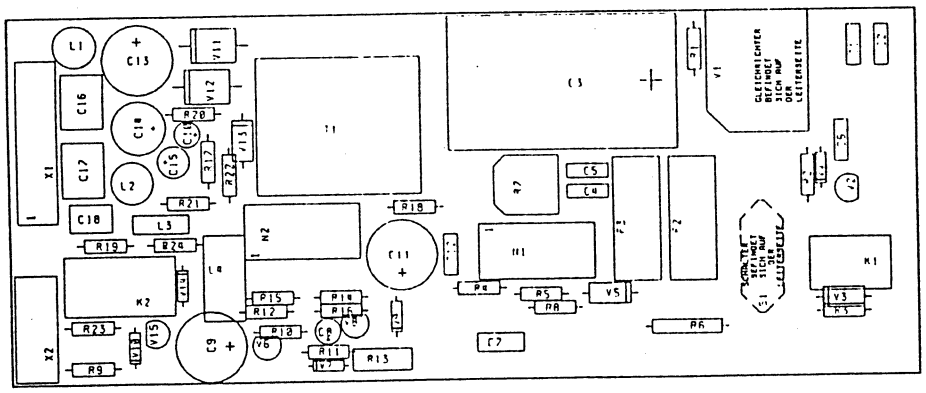
INSTRUCTIONS FOR ALIGNMENT OF POWER SUPPLY UNIT

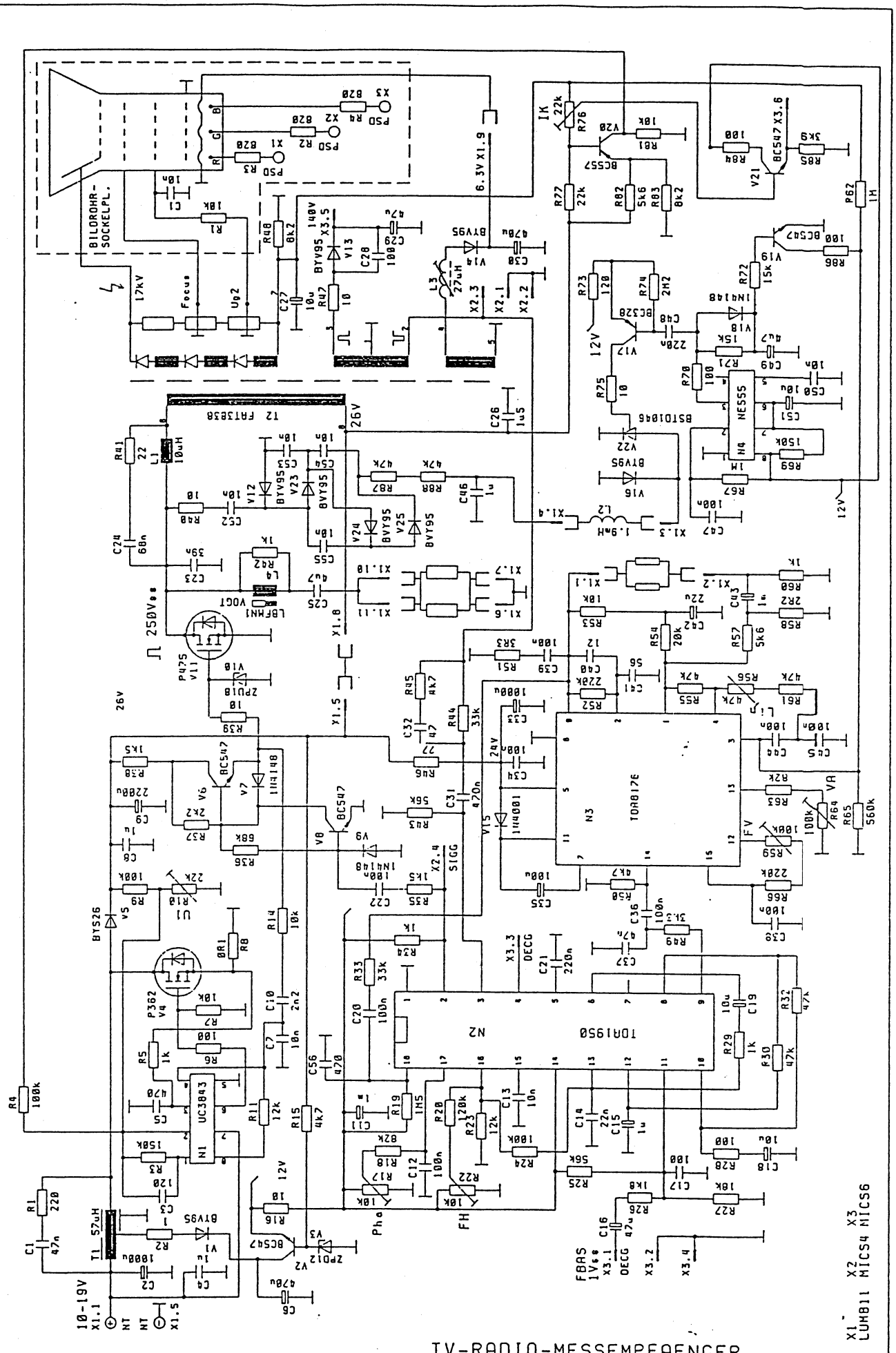
Battery voltages monitoring circuit:

1. Connect external power supply to X2/5.
2. Disconnect batteries and mains plug.
3. Alter external source and align R13 so that the unit switches off at 8,7V.

Charging voltage:

1. Adjust R7 so that charging voltage at N1/pin2 is +15V.





	TAG	NAME
BEARB.	21.4.89	KOLLER
GEPR.		
GEAND.		
INDEX	C	

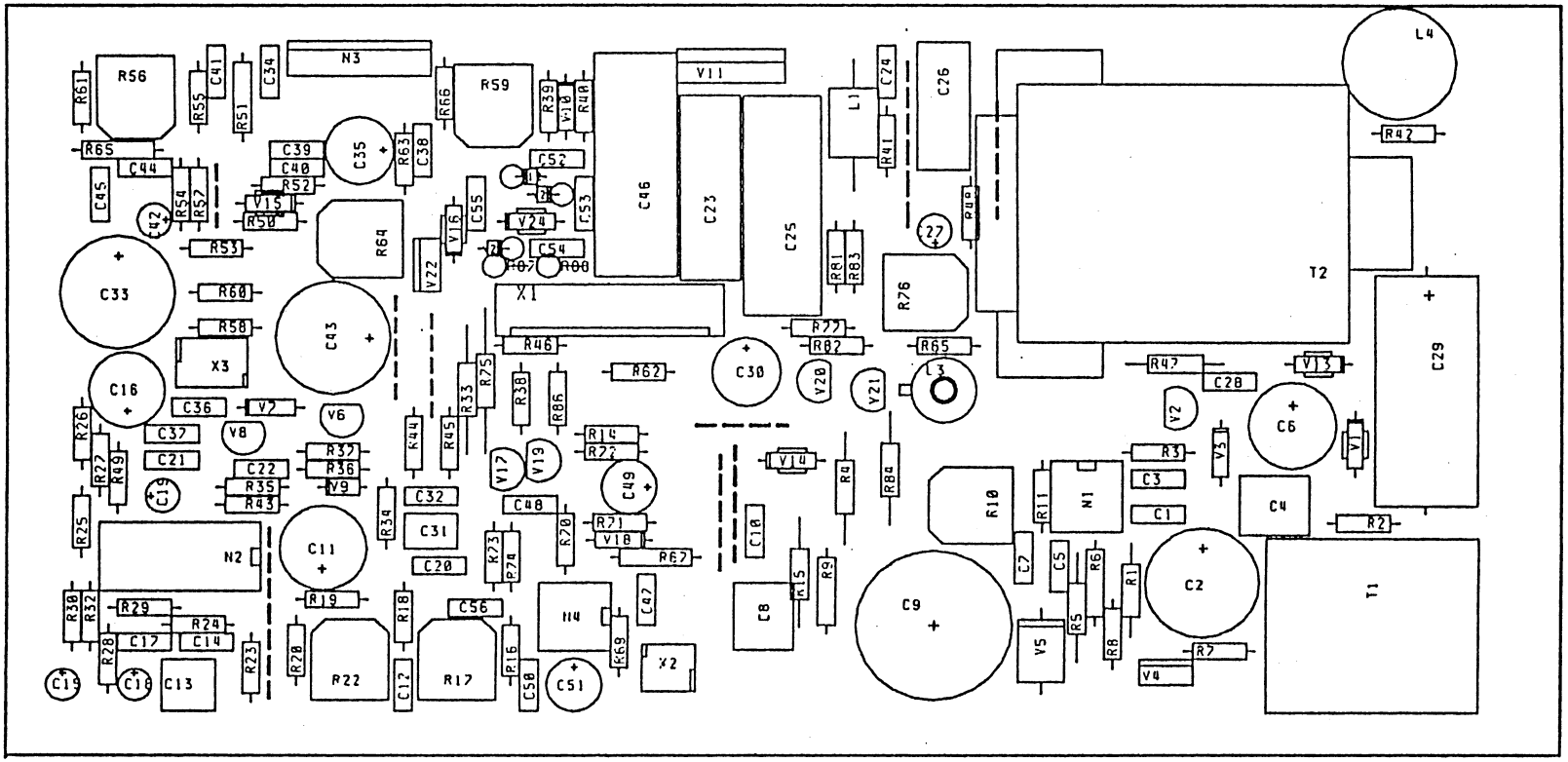
KATHREIN
ANTENNEN · ELECTRONIC
COMMUNICATIONS-ANLAGEN
POSTFACH 260 D-8200 ROSENHEIM 2
TEL. 08031/184-0

MFK 85

LINE-FIELD-TIMEBASE

KIP85C-D

BLATT 1



KIP85C-L

	1989	DATUM	NAME	BESTUECKUNGSPLAN	LINE-FIELD-TIMEBASE
	BEARB.	21.4.	KOLLER		
	GEPR.				
	INDEX	C	1375/89		

KATEK GMBH
BAHNHOFSTR. 108
D-8217 GRASSAU

MASSTAB	BLATT
1:1	4

INSTRUCTIONS FOR ALIGNMENT OF LINE AND FIELD TIMEBASE

Line Frequency:
1. Short circuit R26 to ground.
2. With the adjustment control R22 ,adjust so that the picture runs through slowly.
3. Remove the short circuit.

Line Width:
1. Display crosshatch with circle test pattern.
2. Adjust R10 so that the picture has the correct width.

Line Phase:
1. Adjust picture line symmetry with R17.

Field Frequency:
1. With the adjustment control R59 ,adjust so that the picture stands still.

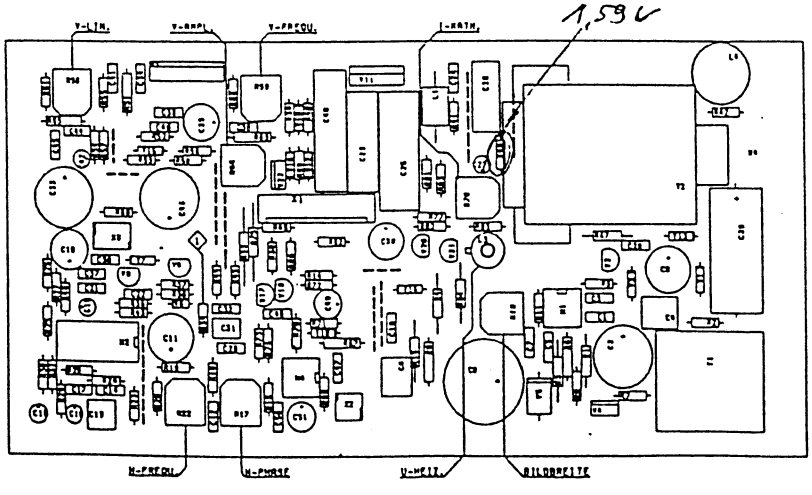
Field Amplitude:
1. Display crosshatch with circle test pattern.
2. Adjust R64 so that the picture has the correct height.

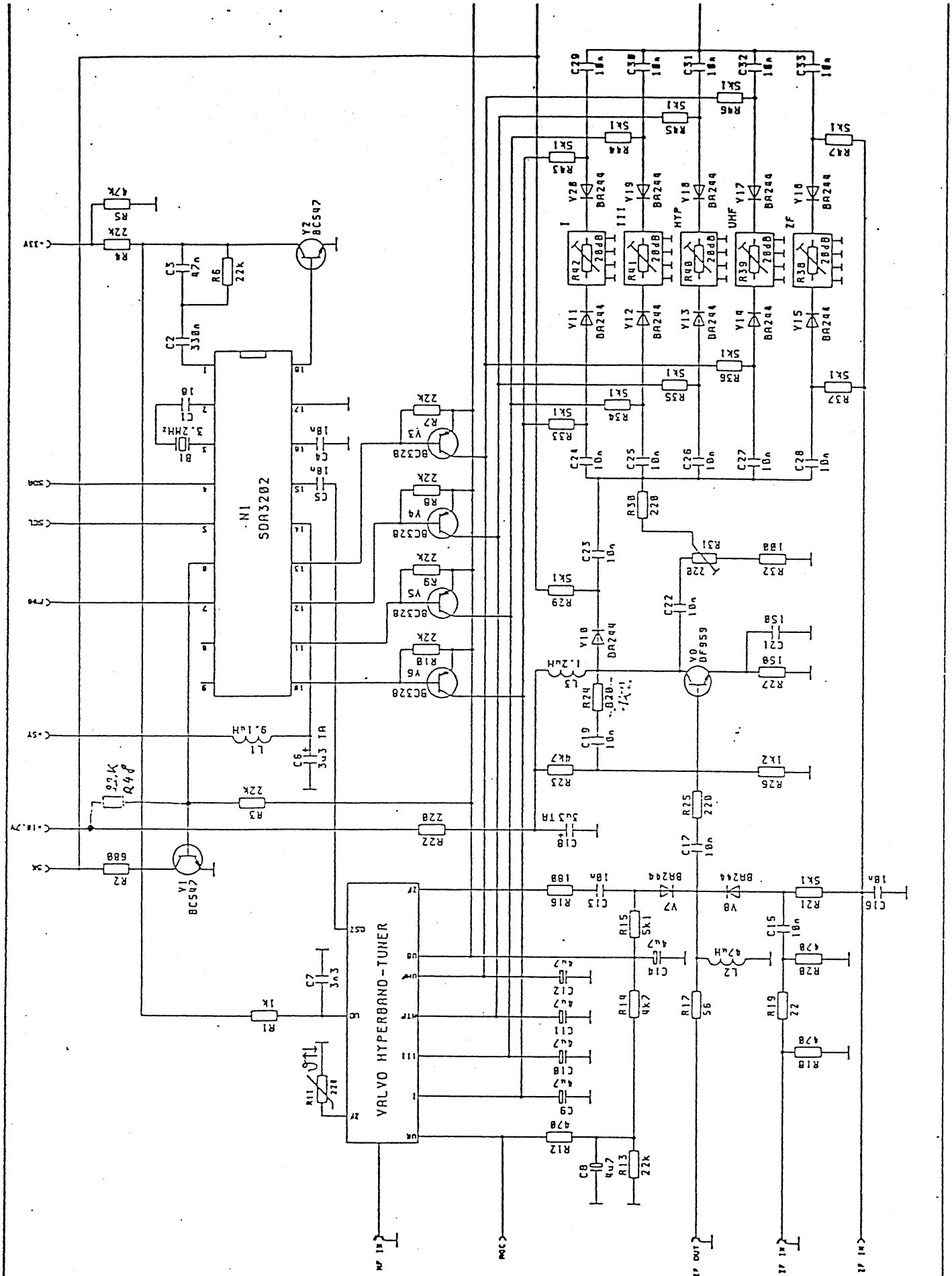
Field Linearity:
1. Display crosshatch with circle test pattern.
2. Adjust R56 so that the picture has the correct shape.

Beam Current:
1. Set brightness and contrast to max.
2. Connect level meter to R48.
3. Set voltage to 1,59V with R76.

CRT-Heater Voltage:
1. Set brightness and contrast to min.
2. Connect level meter to the brown wire of tube base.
3. Set voltage to 6,2V with L3.

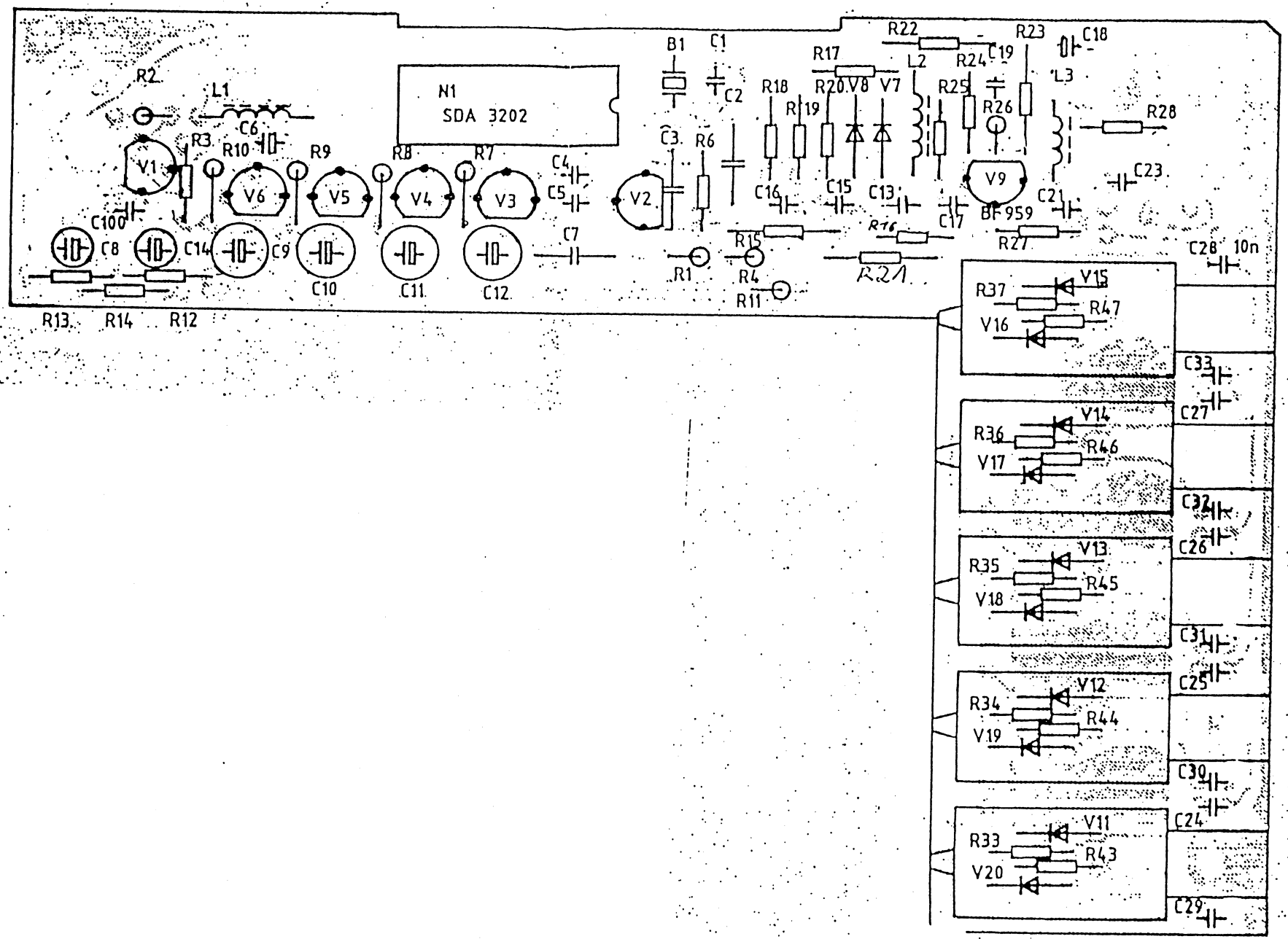
Focus:
1. Adjust potentiometer provided at EHT-transformer so that picture is sharp.

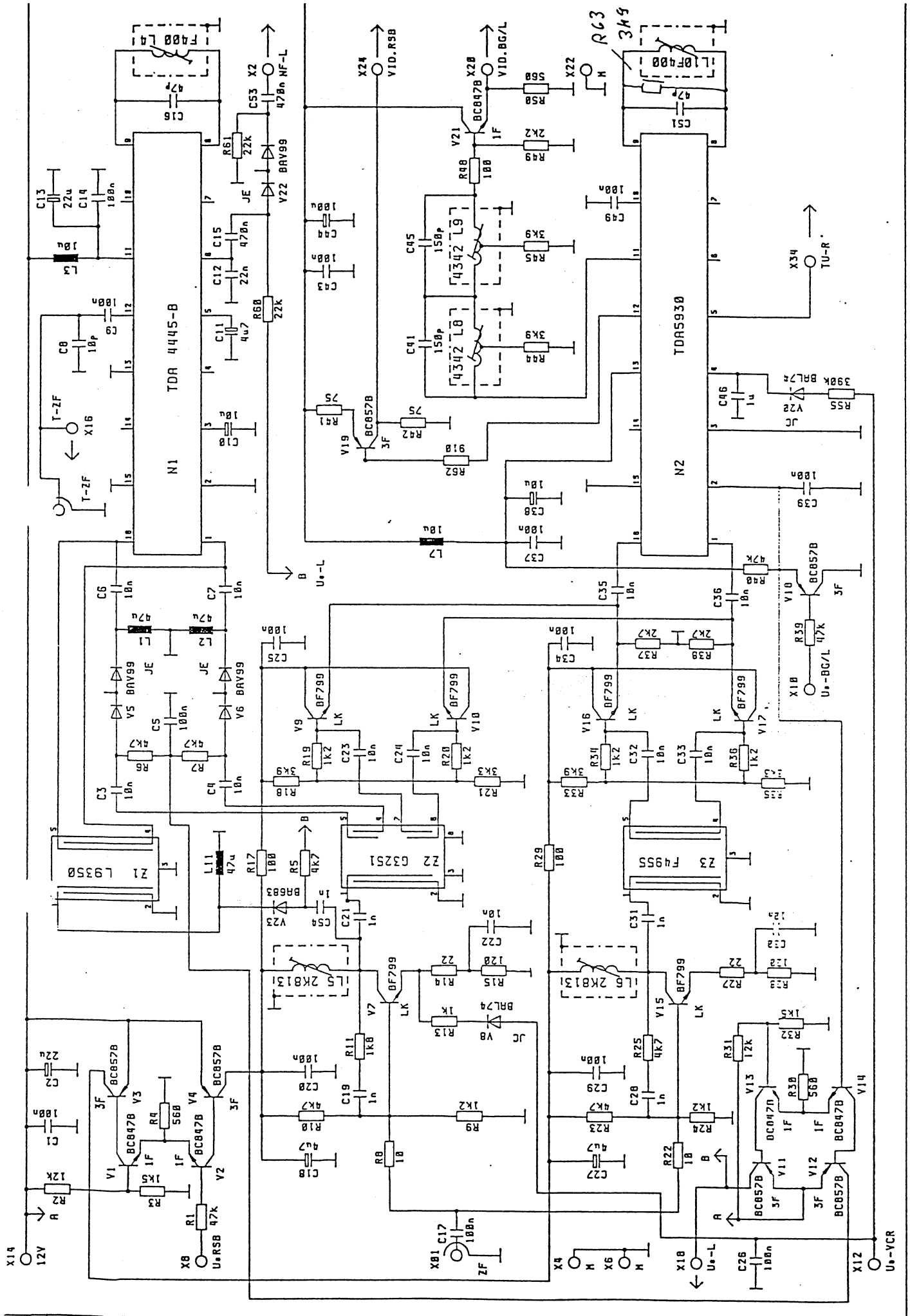




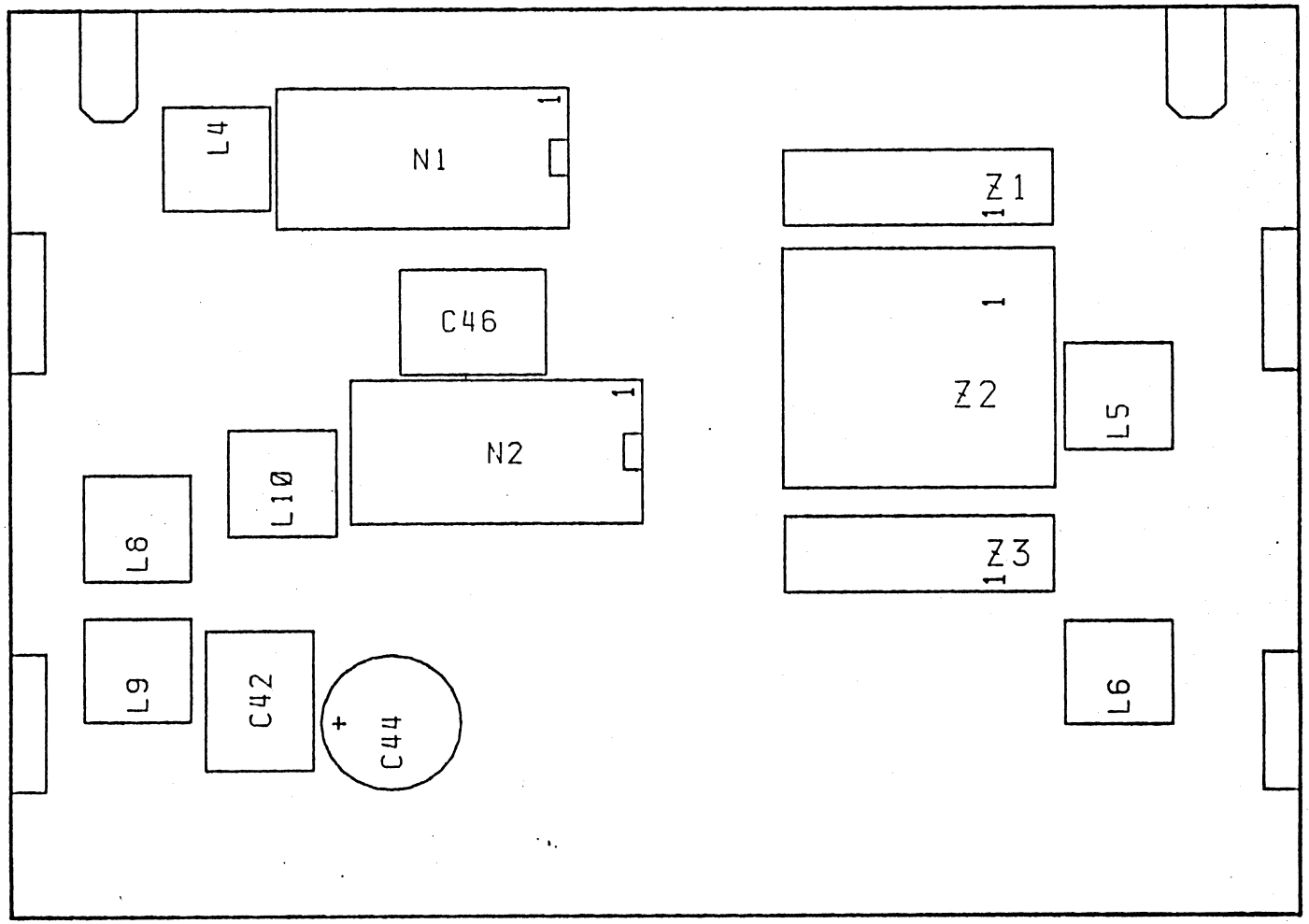
* 15.03.90

1989	TAG	NAME	KATHREIN ANTENNEN · ELECTRONIC COMMUNICATIONS-ANLAGEN POSTFACH 260 D-8200 ROSENHEIM 2 TEL. 08031/184-0	MFK 85/L	TUNER	TU85L-D
BEARB.	13.8%.	HAMM				BLATT 1
GEPR.						
GEZEICH.						
INDEX						


N1
SDA 3202
B1
C1
C2
C3
R1
R2
R3
R4
R6
L1
C6
V1
R10
R9
R8
R7
C4
C5
V6
V5
V4
V3
V2
C100
C8
C14
C9
C10
C11
C12
C7
R13
R14
R12
R15
R11
R16
R21
R17
R18
R19
R20
V8
V7
R22
C19
R23
C18
L2
R24
L3
R25
R26
R28
C23
V9
BF 959
C16
C15
C13
C17
C21
R27
C28 10n
R37
V15
R47
V16
C33
C27
R36
V14
R46
V17
C32
C26
R35
V13
R45
V18
C31
C25
R34
V12
R44
V19
C30
C24
R33
V11
R43
V20
C29



1990	TAG	NAME	KATHREIN	MFK85	BEZ.: IF/VIDEO BG/L/RSB	ZFV3-D
BEARB.	27.02.	HE	ANTENNEN · ELECTRONIC COMMUNICATIONS-ANLAGEN	MFK55	BG-NR: 136.3252	BLATT 1
GEPR.			POSTFACH 260 D-8200 ROSENHEIM 2		LP-NR: 036.3251	
GEAND.			TEL. 08031/184-0			
INDEX						



ZFV-1

1988	DATUM	NAME	BESTUECKUNGSPLAN BAUTEILSEITE
BEARB.	07.04.		
GEPR.		HE	

IF-VIDEO/BG-L-RSB

KATEK GMI
BAHNHOFSTR.1
D-8217 GRASS

MASSTAB	BLATT
2:1	6

INSTRUCTIONS FOR ALIGNMENT OF VIDEO-IF-MODULE ASSEMBLY NO:136.3174

ASSEMBLY NO.167585 NO ADJUSTMENTS ARE NECESSARY.

SERVICE WORK AFTER REPLACING THE MODULE

1. Feed in IF-frequency modulated with multiburst,80dBµV.
   Connect oscilloscope to scart-socket via 75ohm Feed Through Termination.Display multiburst signal on the scope.

2. Set with R48 video signal to maximum.
   Connect test point to ground.
   Set L10 so that the multiburst signal slopes linear from 0,5MHz (highest point) to 4,8MHz.The 5,8MHz wave is suppressed.
   Disconnect wire link.

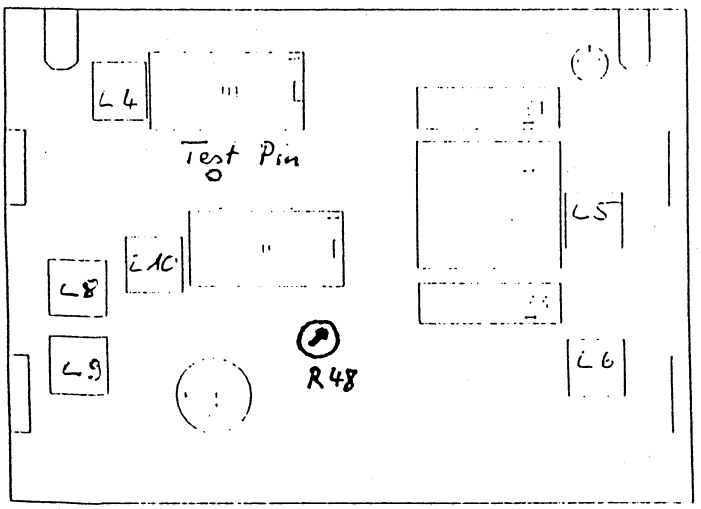
3. Set L5 so that the first(0,5MHz) and second(1,5MHz)multiburst waves are at the same level,but lower than the reference wave.

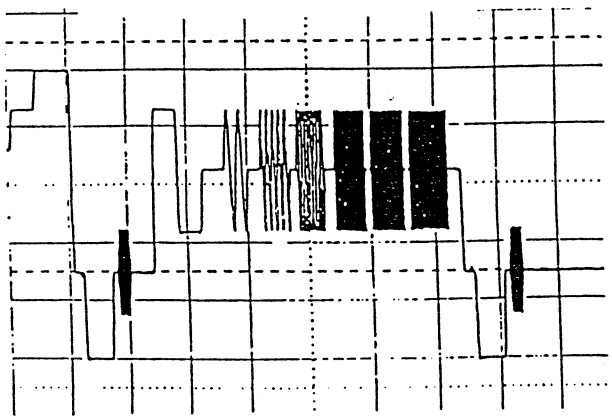
4. Adjust L8 and L9 so that the last package is at maximum and no interference is visible.

5. Feed in dual sound,set unit to second sound carrier reception.
   Suppress intercarrier interference with L4.

6. The core of L6 must be settled 1,5 windings above coil metal frame.

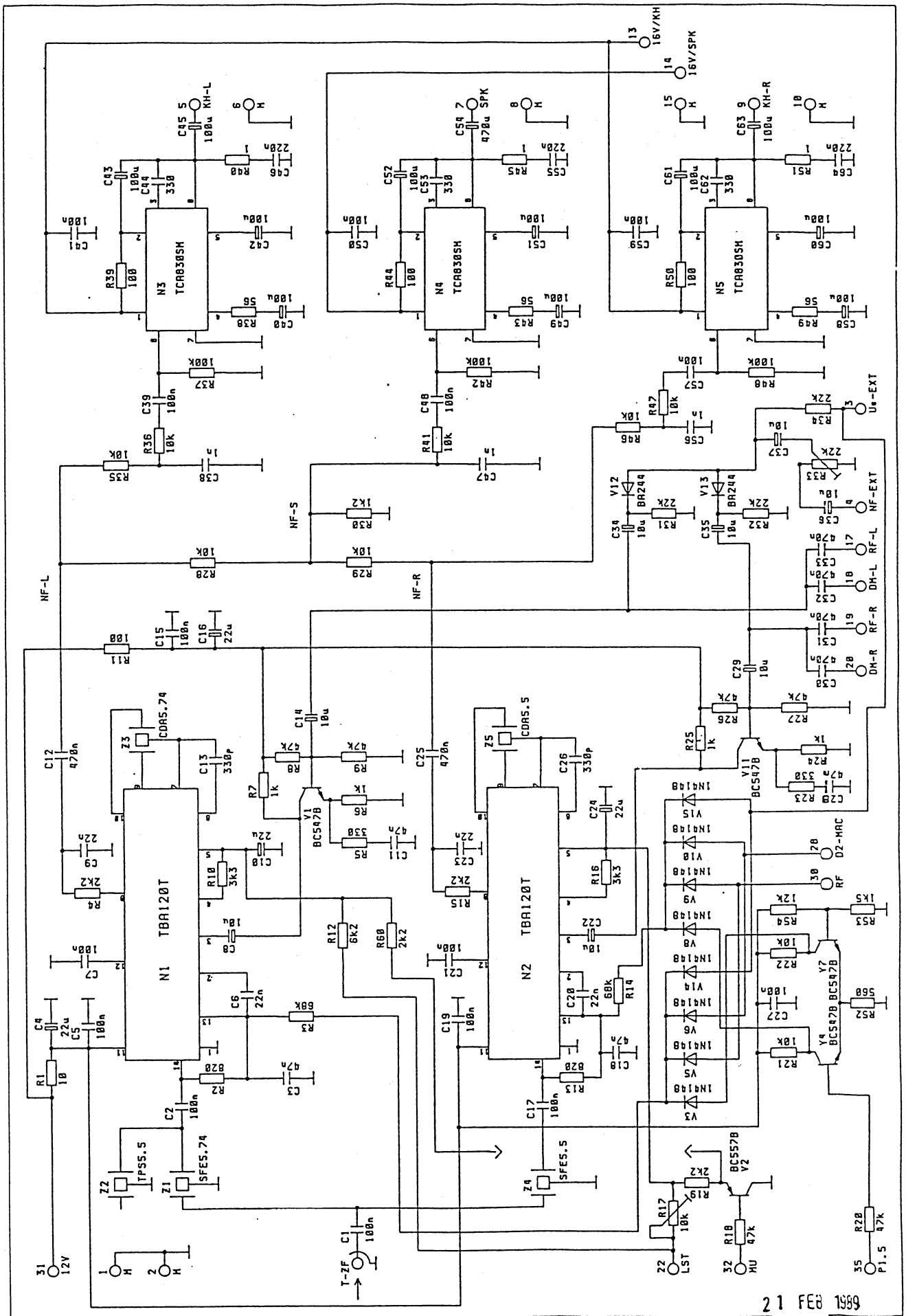
7. With adjustment control R48 video signal is set to 1Vpp.





NOT DISTORTED MULTIBURST SIGNAL

0.5 MHz - 1.5 MHz - 3.0 MHz - 4.43 MHz - 4:8 MHz - 5.8 MHz



1989	TAG	NAME
BEARB.	17.01.	HE
GEPR.		
GEAND.		
INDEX	A	

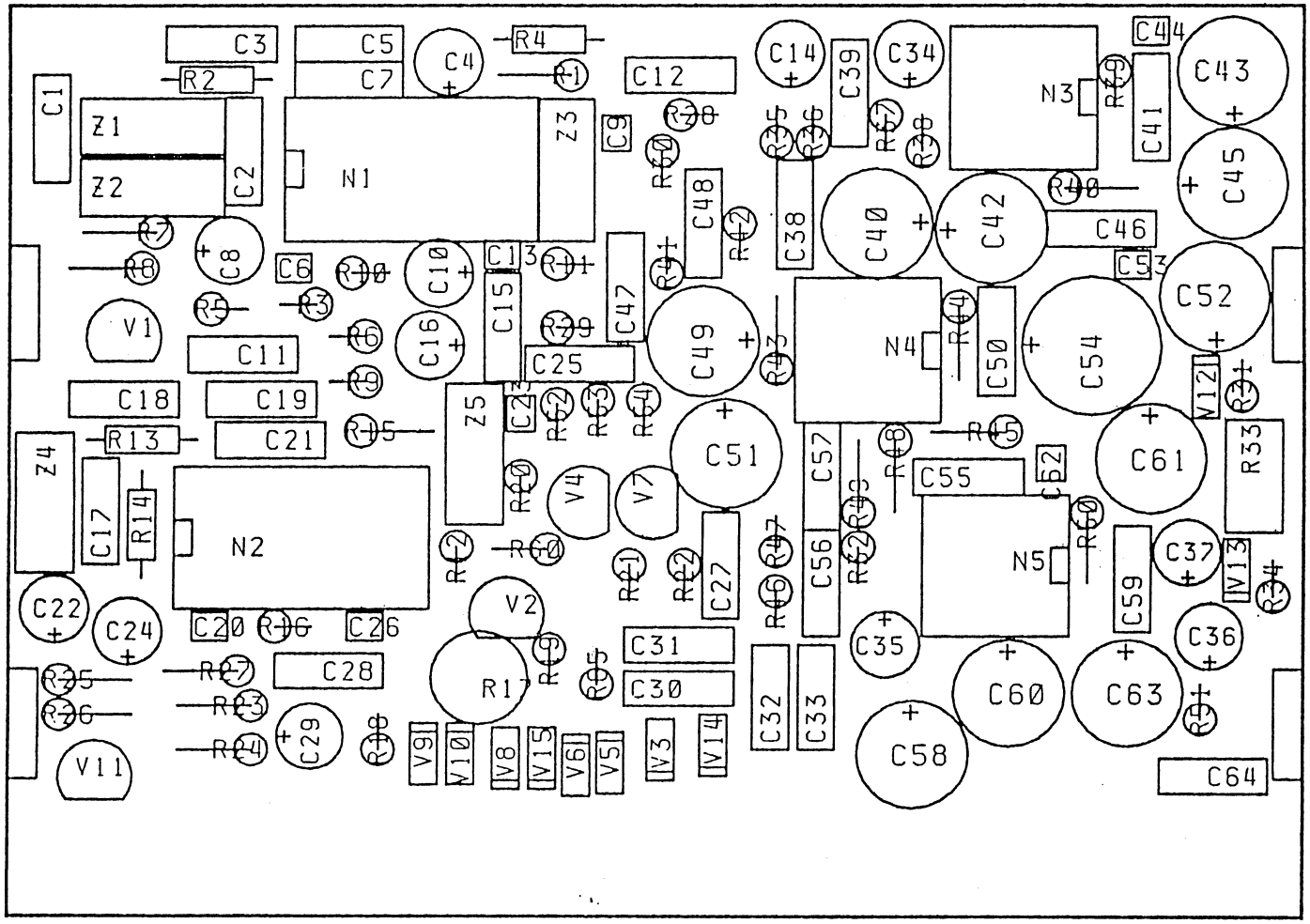
KATHREIN
ANTENNEN · ELECTRONIC
COMMUNICATIONS-ANLAGEN
POSTFACH 260 D-8200 ROSENHEIM 2
TEL. 08031/184-0

MFK 85

SOUND-IF-MODULE

TZF85-D

BLATT 1



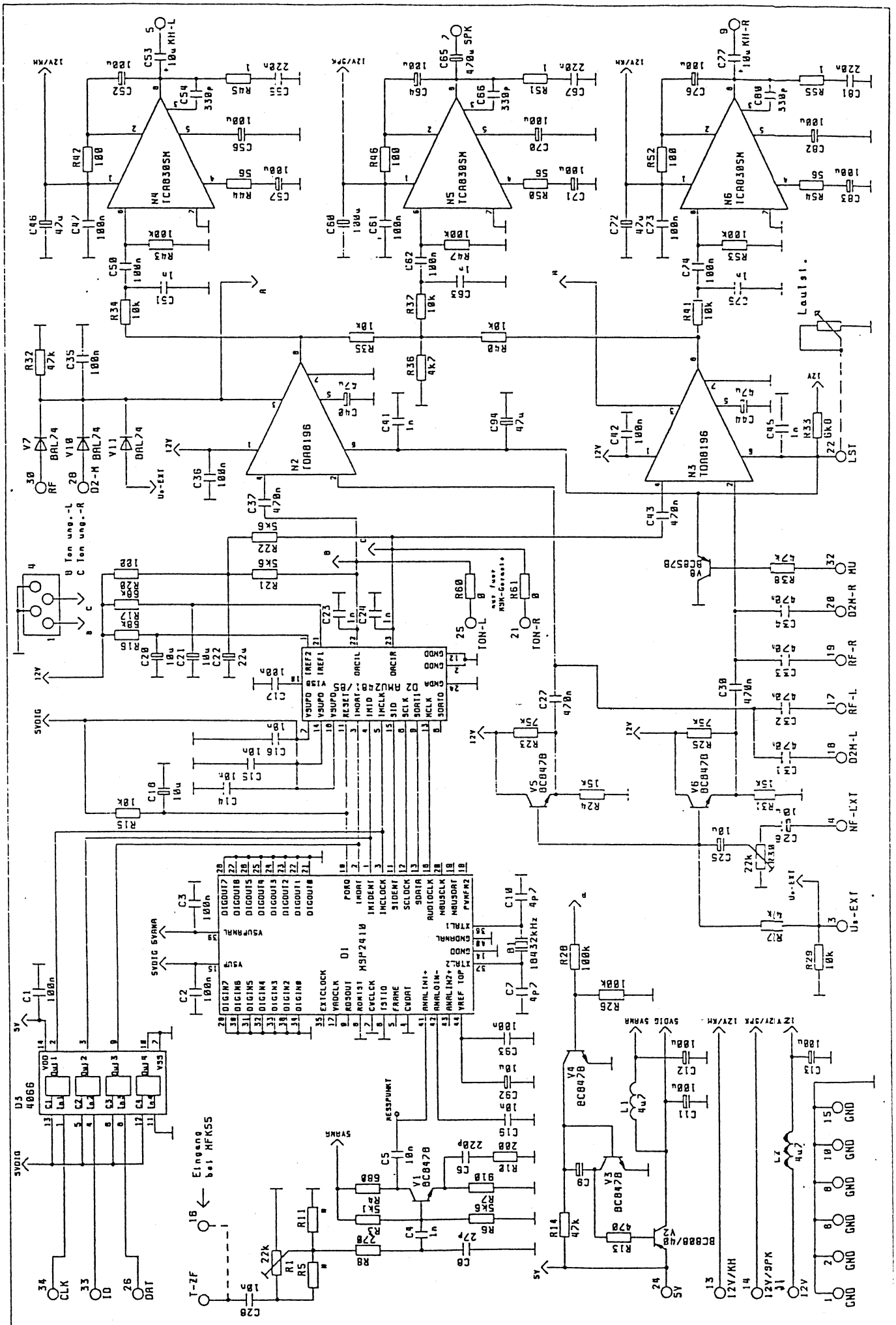
TZF85-L

	1989	DATUM	NAME
	BEARB.	10.08.	KA/HE
	GEPR.		
	INDEX	A	

SOUND-IF-MODULE MFK 85

KATEK GMBH
BAHNHOFSTR.108
D-8217 GRASSAU

MASSTAB	BLATT
2:1	6



1992	TAG	NAME
BEARB.	20.08.	Ka
GEPR.		
GEAND.		
INDEX		

KATHREIN

ANTENNEN · ELECTRONIC
COMMUNICATIONS-ANLAGEN
POSTFACH 280 D-8200 ROSENHEIM 2
TEL. 08031/ 184-0

MULTISOUND-IF-MODULE

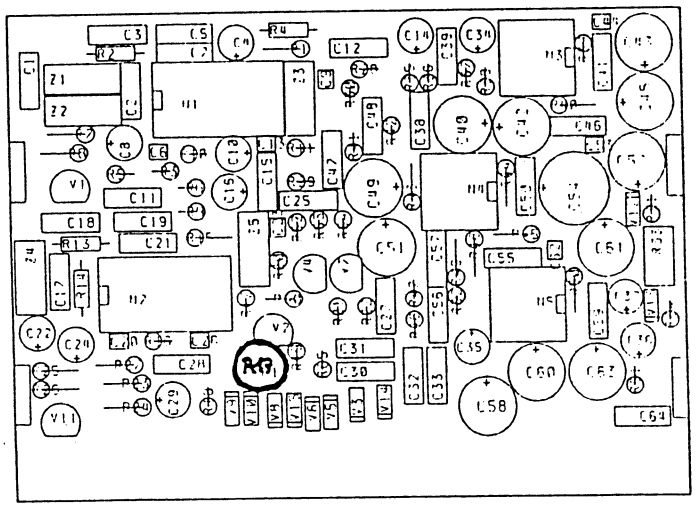
MT-0

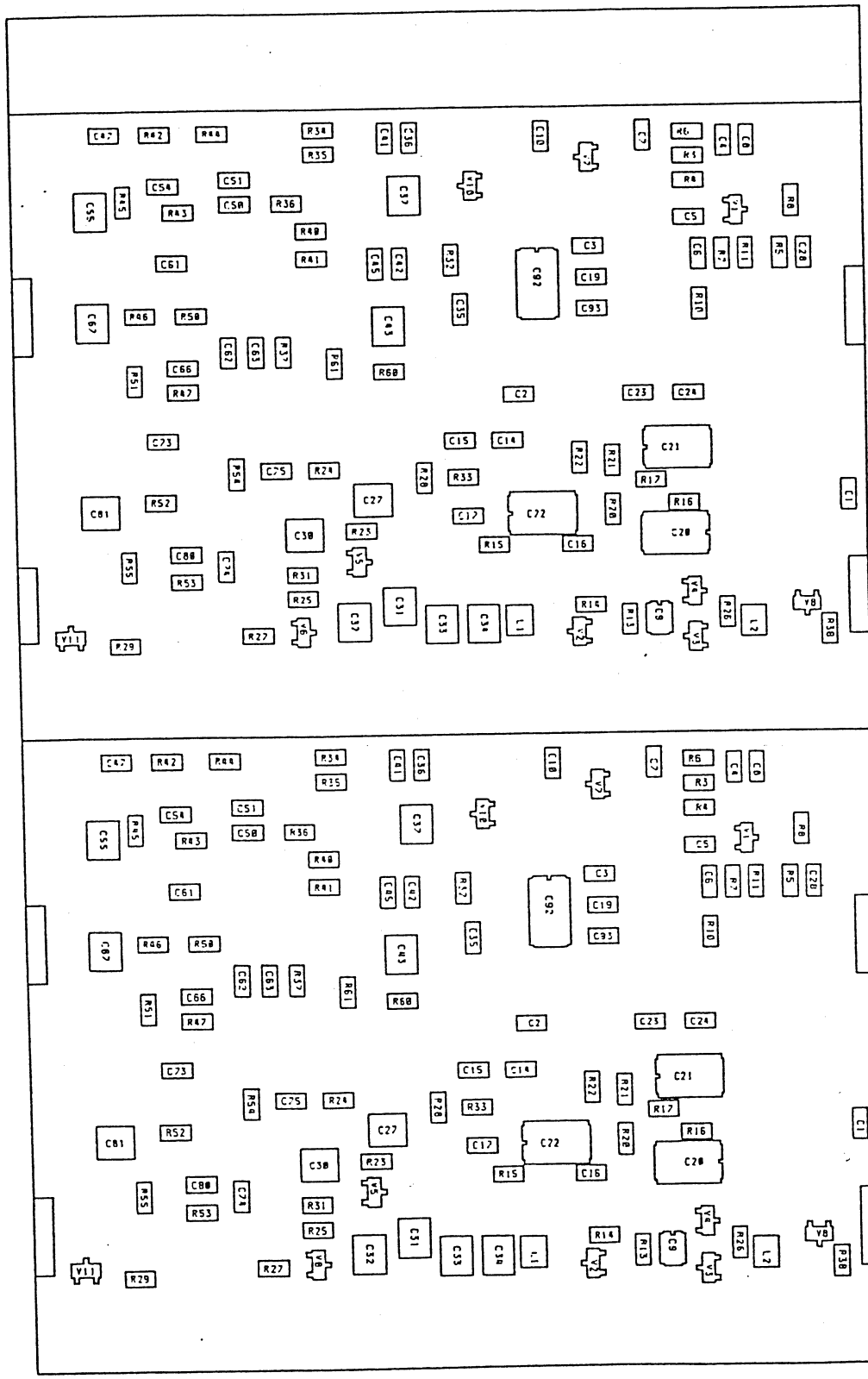
BLATT 1

INSTRUCTIONS FOR ALIGNMENT OF SOUND-IF-BOARD

Left and Right
Level Symmetry:

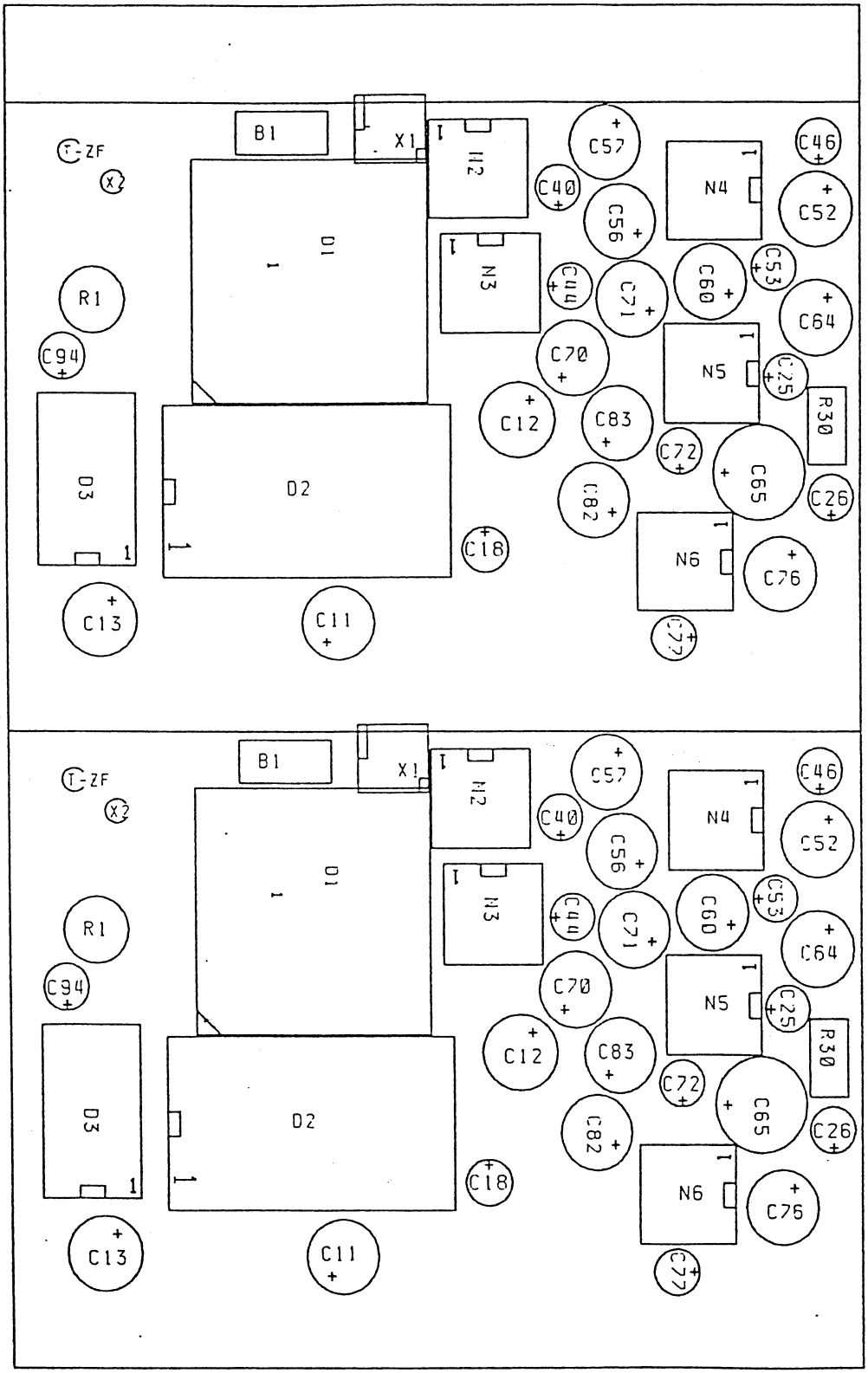
1. Feed in 95MHz, deviation 40kHz, f-mod. 1kHz, switch to RADIO mode, volume control nominal.
2. Connect probes of dual-trace oscilloscope to stereo jack socket.
3. Alter R17 so that sinus waves coincide with each other.





MT-L

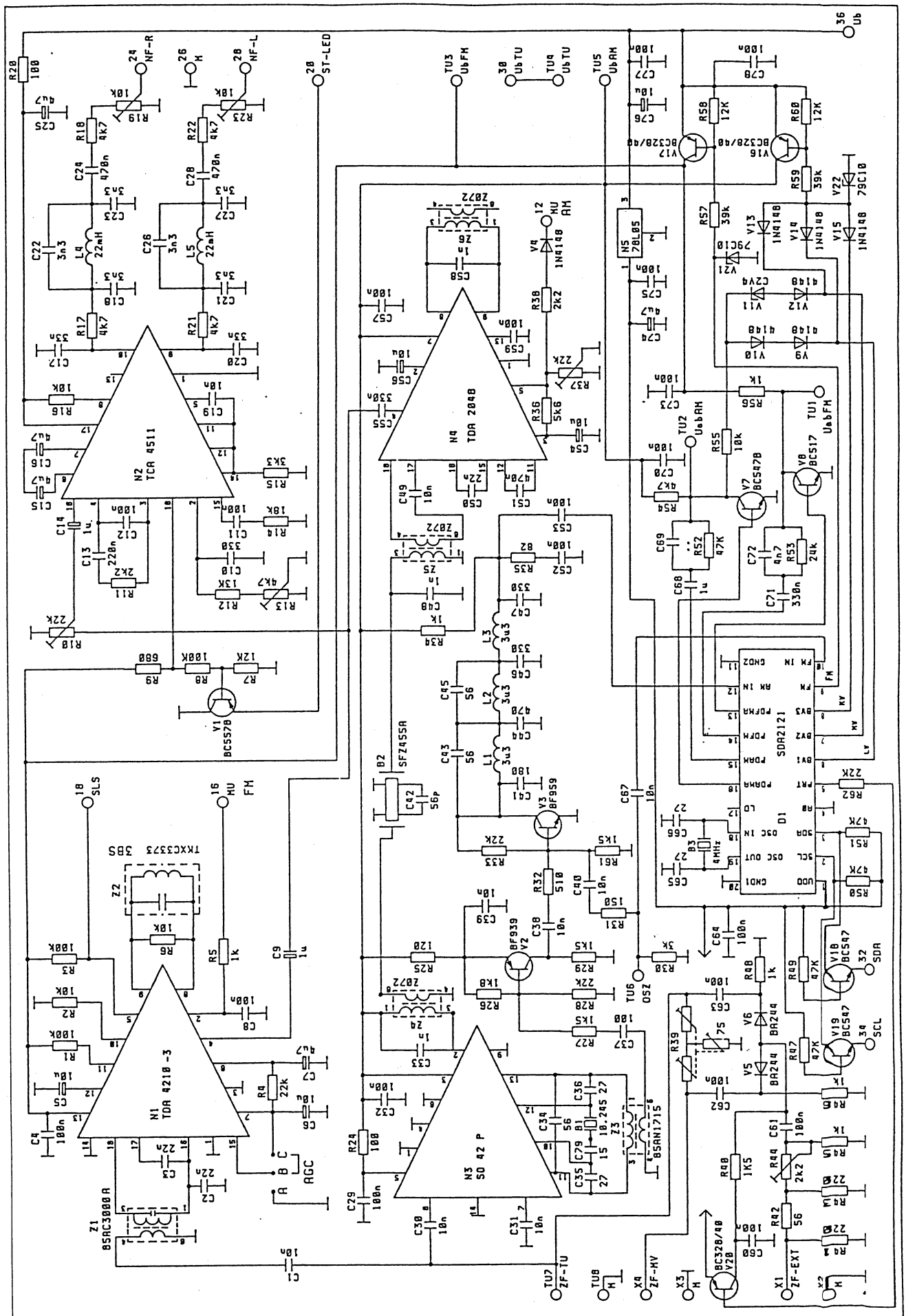
1992	DATUM	NAME	MULTISOUND-IF-MODULE	KATEK GMBH BAHNHOFSTR. 188 O-8217 GRASSAU
BEARB.	17.09.	KA/BRE		MASSTAB 1,5:1
				BLATT 8
INDEX				



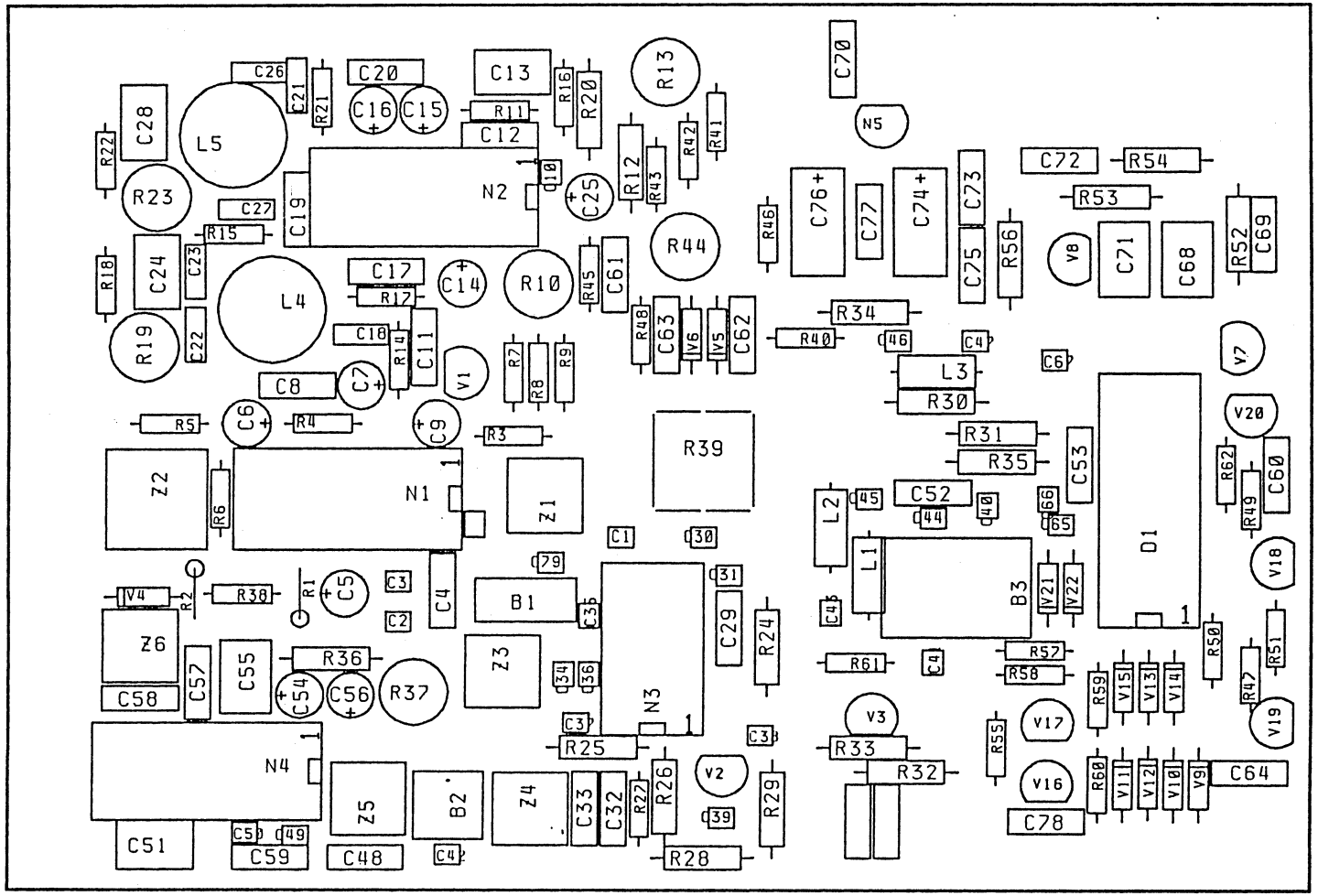
MT-L

1992	DATUM	NAME
BEARB.	17.09.	KA/BRE
INDEX		

BESTUECKUNGSPLAN BAUTEILSE **MULTISOUND-IF-MODULE**

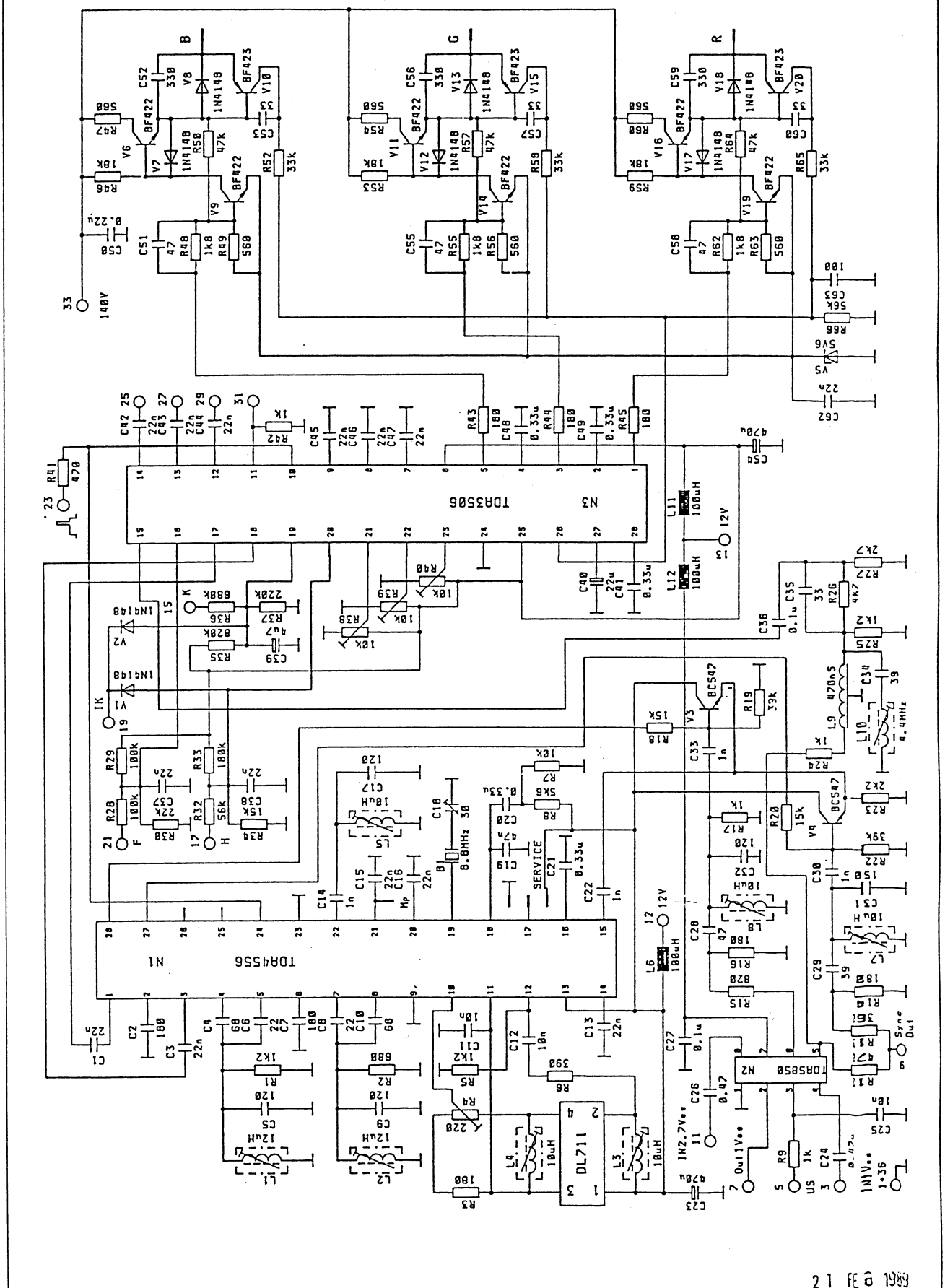


1988	TAG	NAME	KATHREIN ANTENNEN · ELECTRONIC COMMUNICATIONS-ANLAGEN POSTFACH 260 D-8200 ROSENHEIM 2 TEL. 08031/184-0	MFK 85	BEZ.: RADIO-ZF-PLATINE BG-NR: 136.3069 LP-NR: 036.3068 21 FEB 1989	RZF858-D
BEARB.	14.11.	HE				BLATT 1
GEPR.						
GEAND.						
INDEX						



RZF85B-L

	1989	DATUM	NAME	BESTUECKUNGSPLAN	BEZ. RADIO-ZF-PLATINE	KATEK GMBH BAHNHOFSTR. 108 D-8217 GRASSAU
	BEARB.	03.07.	HE		MAT-NR. 036.3068	MASSTAB 1.52 / BLATT 6
	GEPR.				BG-NR. 136.3069	
	INDEX					



	TAG	NAME
BEARB.	88.88.	KOLLER
GEPR.		
GEAND.		
INDEX		

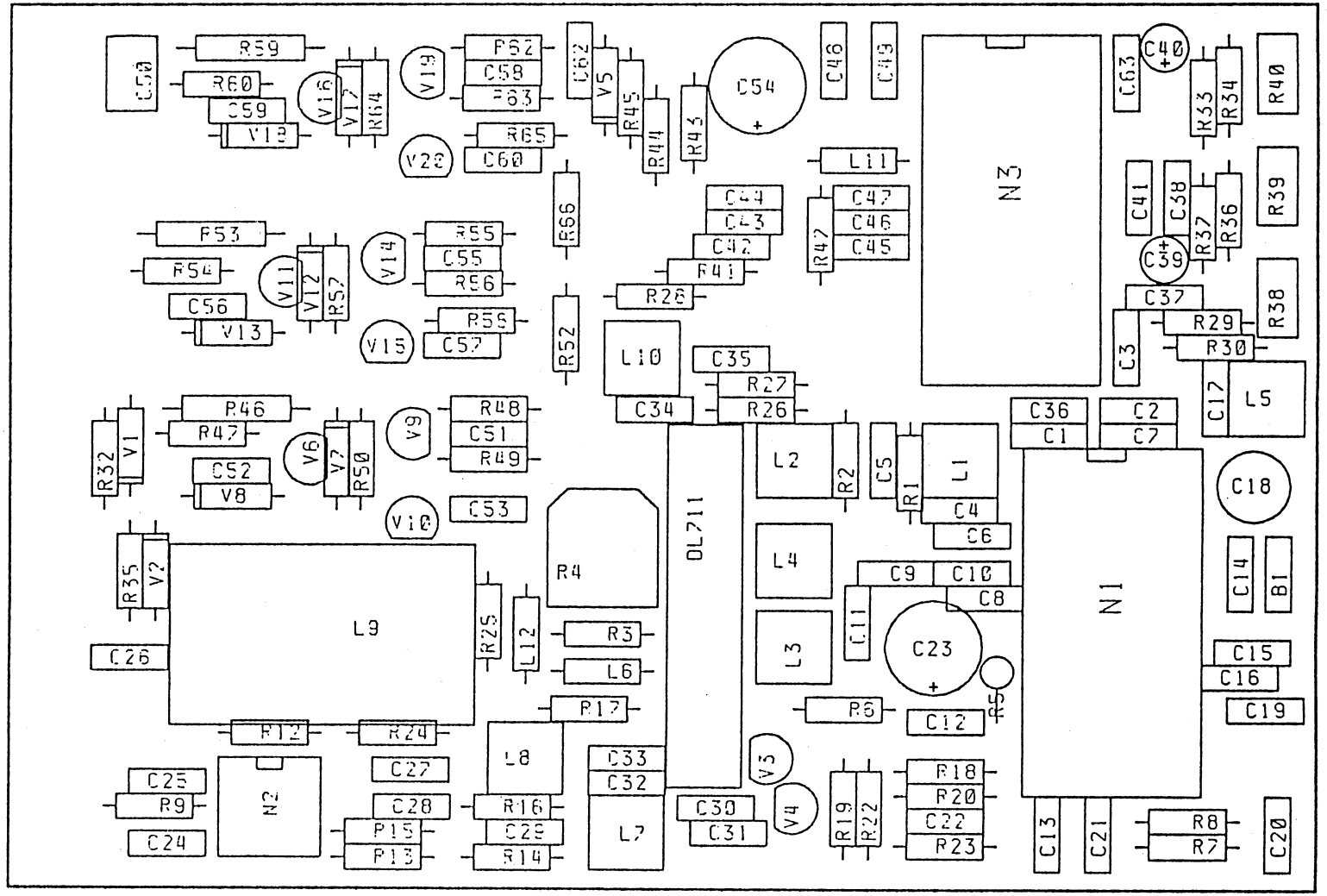
KATHREIN
ANTENNEN · ELECTRONIC
COMMUNICATIONS-ANLAGEN
POSTFACH 260 D-8200 ROSENHEIM 2
TEL. 08031/184-0

MFK 85

BEZ.: PAL/SECAM-DECODER
BG-NR: 136.2945
LP-NR: 036.2944

PSD-D

BLATT 1

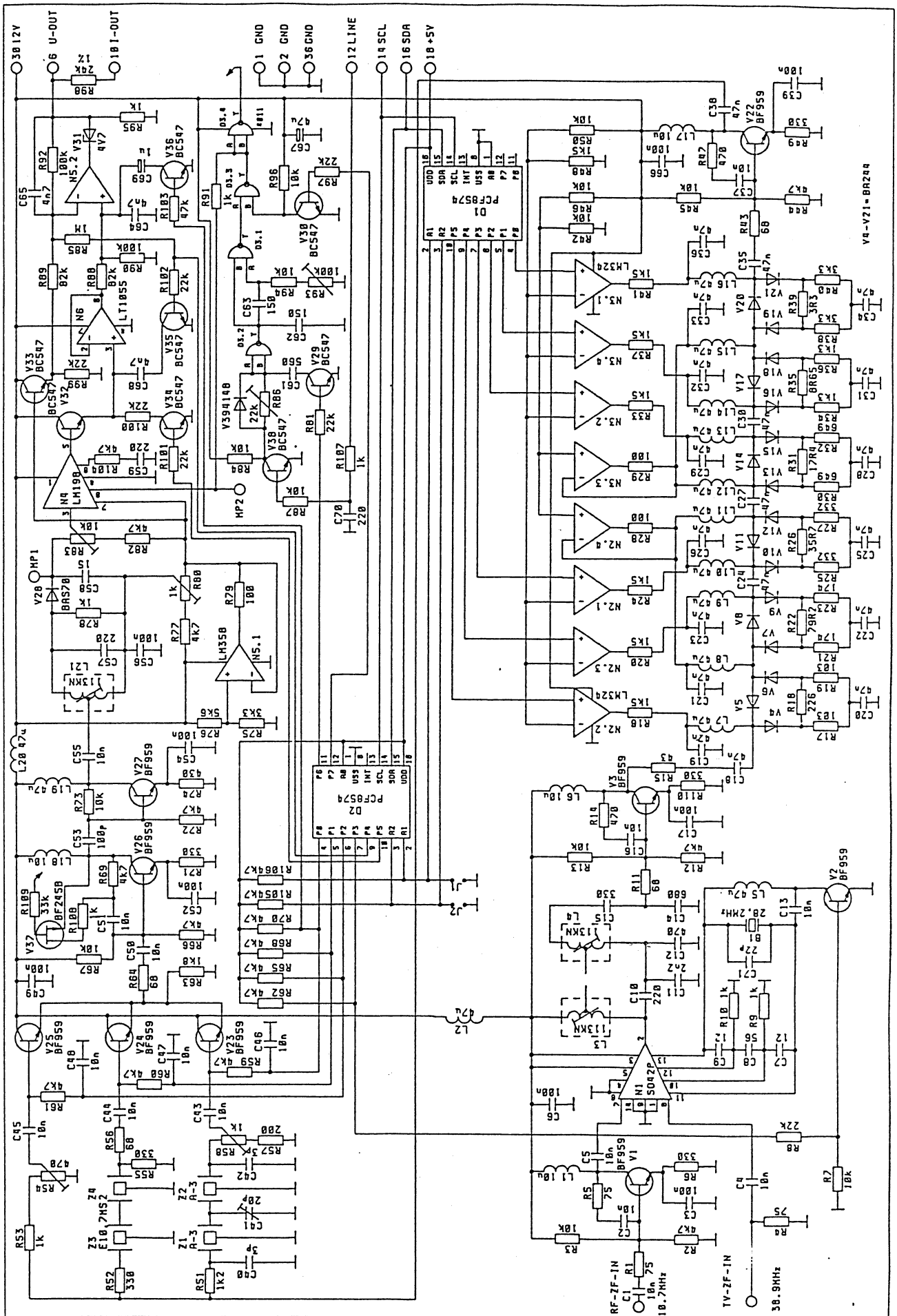


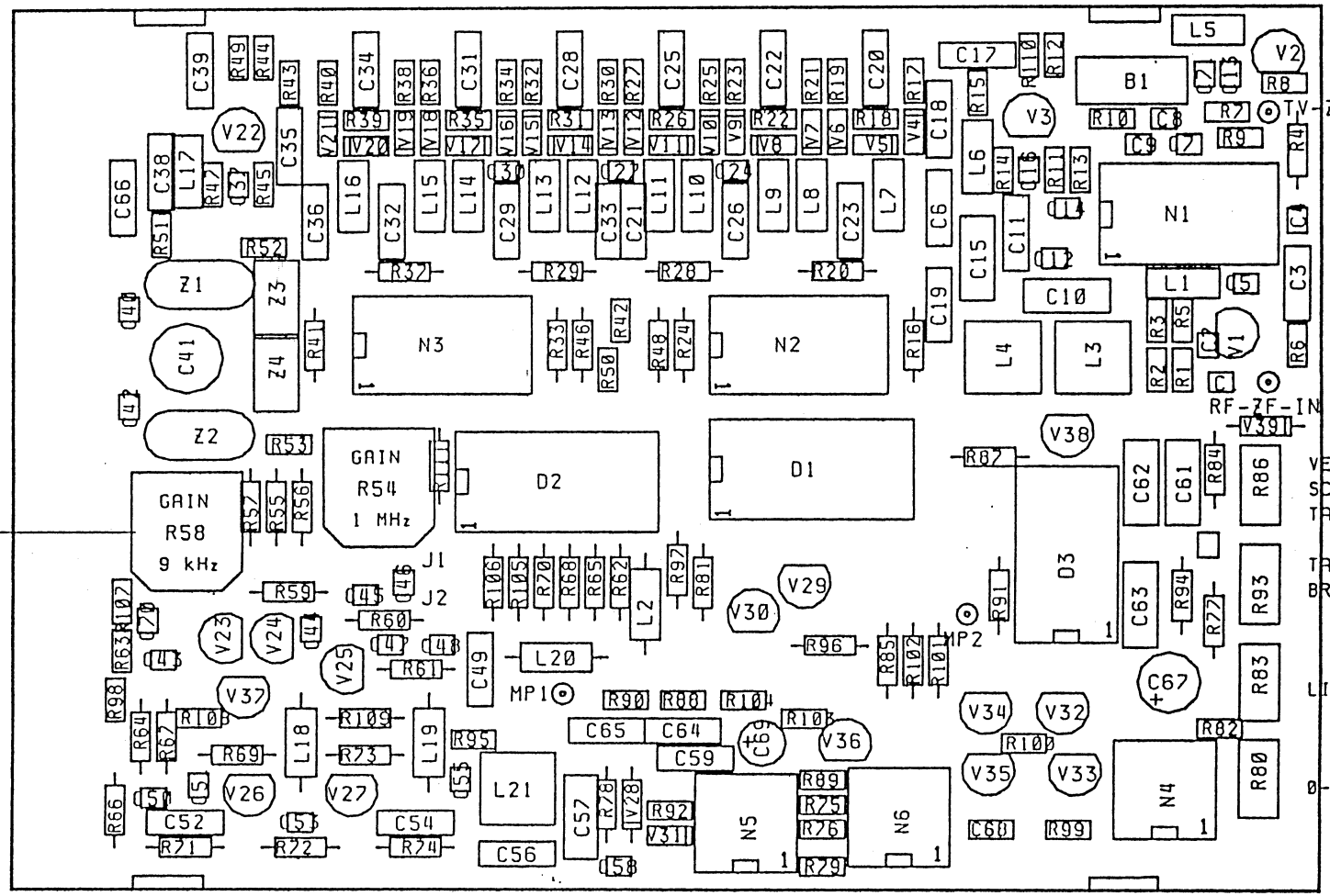
PSD-L

	1989	DATUM	NAME	BESTUECKUNGSPLAN	BEZ. PAL/SECAM DECODER
	BEARB.	10.03.	KOLLER		MAT-NR. 036.2944
	GEPR.				BG-NR. 136.2945
	INDEX				

KATEK GM
BAHNHOFSTR. 1
O-8217 GRASS

MASSTAB	BLAT
1,52	6


3 B 12V
6 U-OUT
10 I-OUT
1 GND
2 GND
36 GND
12 LINE
14 SCL
16 SDA
18 +5V
MEASUREMENT AMP.
MFK 85
KATHREIN
ANTENNEN - ELECTRONIC
COMMUNICATIONS-ANLAGEN
POSTFACH 260 D-8200 ROSENHEIM 2
TEL. 08031/ 184-0
1989
TAG
NAME
BEARB. 22.02. KL/OL
GEPR.
GEANO.
INDEX
MA2-D
BLATT 1
23 FEB 1989
RF-ZF-IN
TV-ZF-IN
38.9MHz
10.7MHz



MA3-L

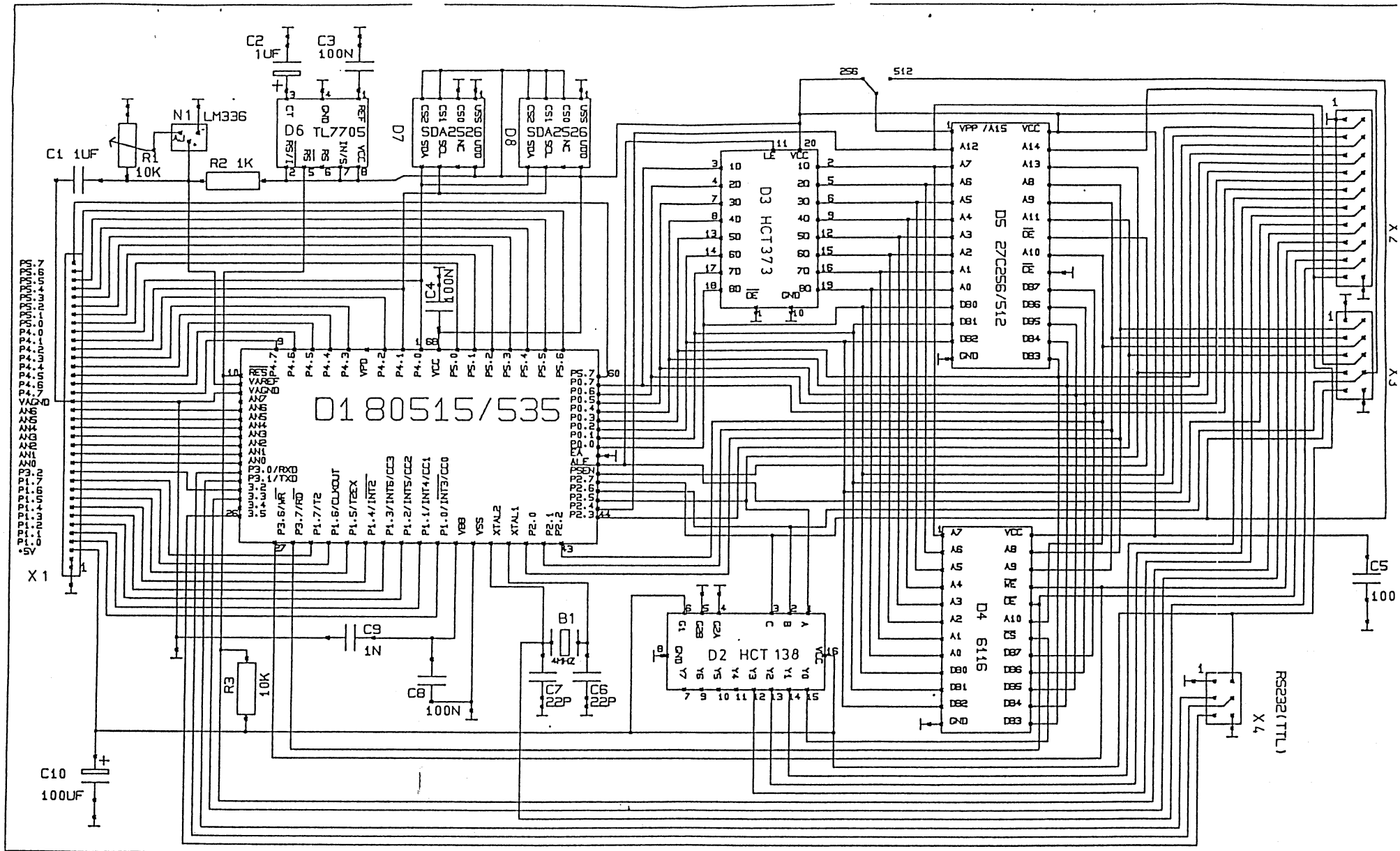
1989	DATUM	NAME
BEARB.	13.10.	KL/LA
INDEX	A	1381/89

BESTUECKUNGSPLAN

MEASUREMENT AMP.

KATEK GMBH
BAHNHOFSTR. 108
D-8217 GRASSAU

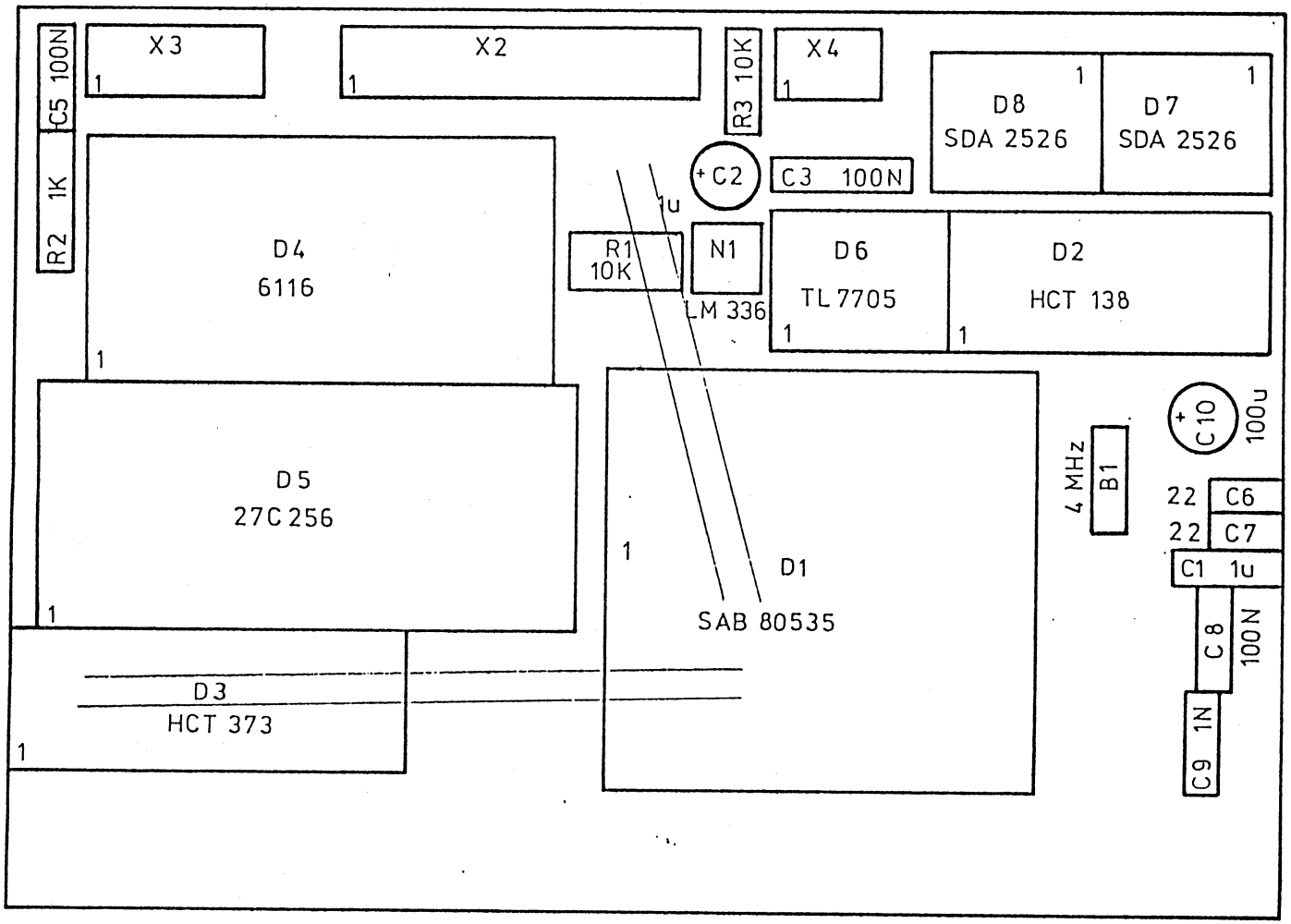
MASSTAB	BLATT
1,52	6



	1987	TAG	NAME	SCHALTPLAN	BEZ. MICROCOMPUTER MFK85
	BEARB.	22.12.	W.K.		MAT.-NR. 036 2977
	GEPR.				BG.-NR. 136 2978

MASSTAB

BLATT 1



C4 100N auf der Leiterseite

1988	DATUM	NAME	BESTUECKUNGSPLAN	BEZ. MICROCOMPUTER MFK85	KATEK GMBH BAHNHOFSTR. 108 D-8217 GRASSAU
BEARB.	16.06	W.K.		MAT.-NR. 036 2977	MASSTAB 2:1 / BLATT 6
GEPR.				BG-NR. 136 2978	

SOFTWARE VERSION MFK85

V4.2	Tuner with four potentiometer Reference voltage MC-Module 4,56V
V4.2 B	Tuner with four potentiometer Reference voltage MC-Module 2,56V
V4.2 AB	Tuner with five potentiometer Reference voltage MC-Module 2,56V

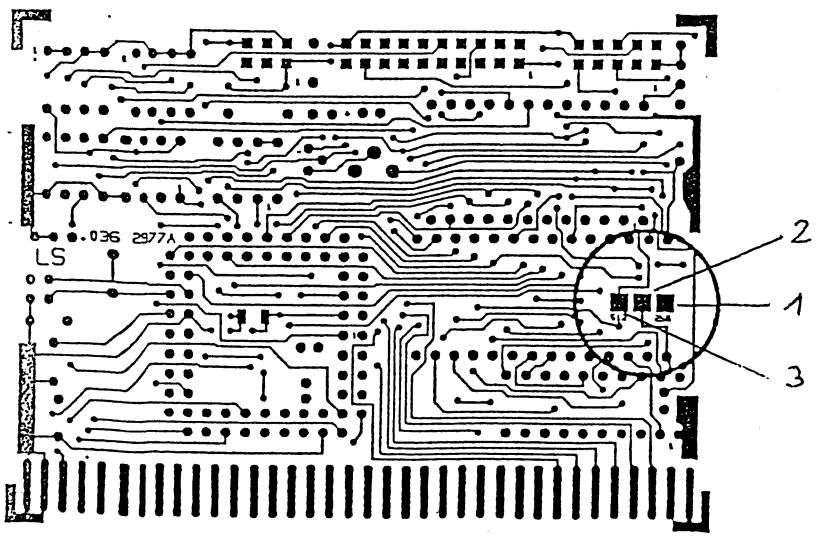
Software also in TELEKOM version available PTT

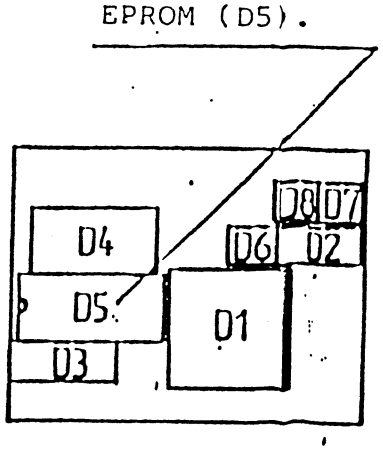
V4.12 N	Nicam,english
V4.22	
V4.22 B	ENGLAND
V4.22 AB	
V4.23	
V4.23 B	FRANCE
V4.23 AB	

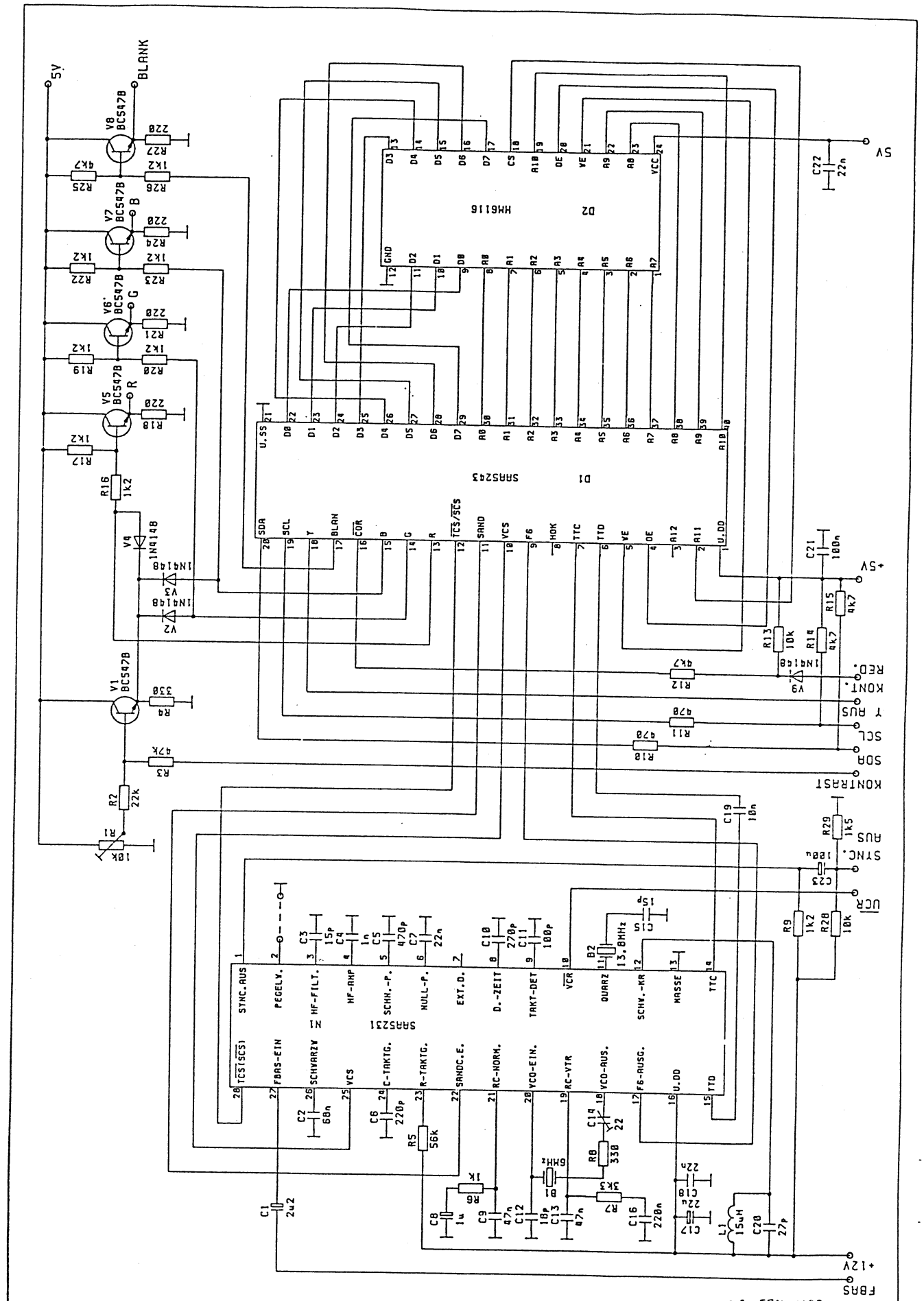
Instruction of changing EPROM

EPROM 27C256: Useing this chip make a solder strap from eyelet 1 to eyelet 2.

EPROM 27C512: Useing this chip make a solder strap from eyelet 2 to eyelet 3.







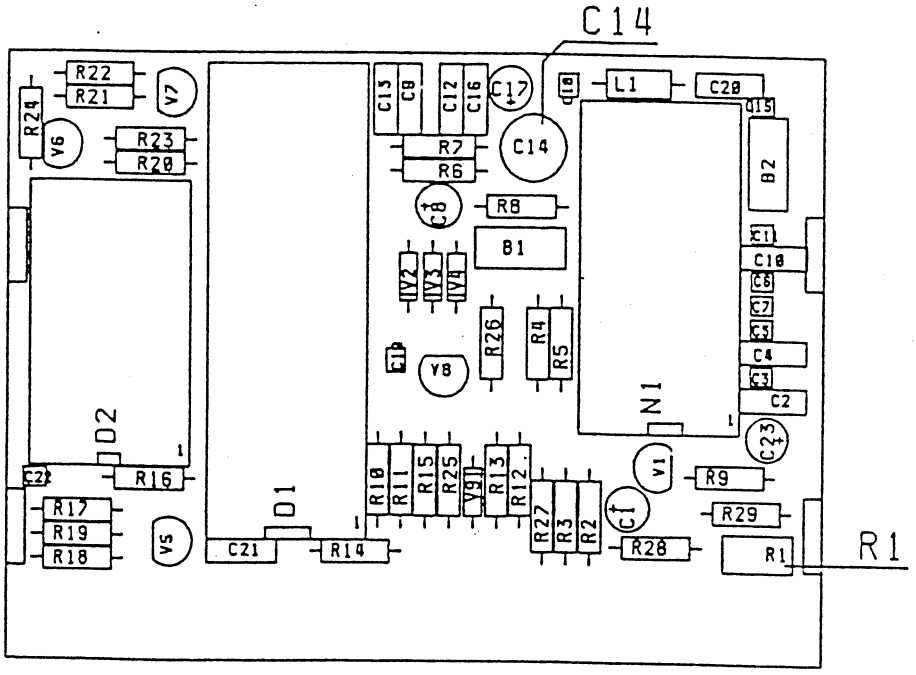
21 FEB 1989

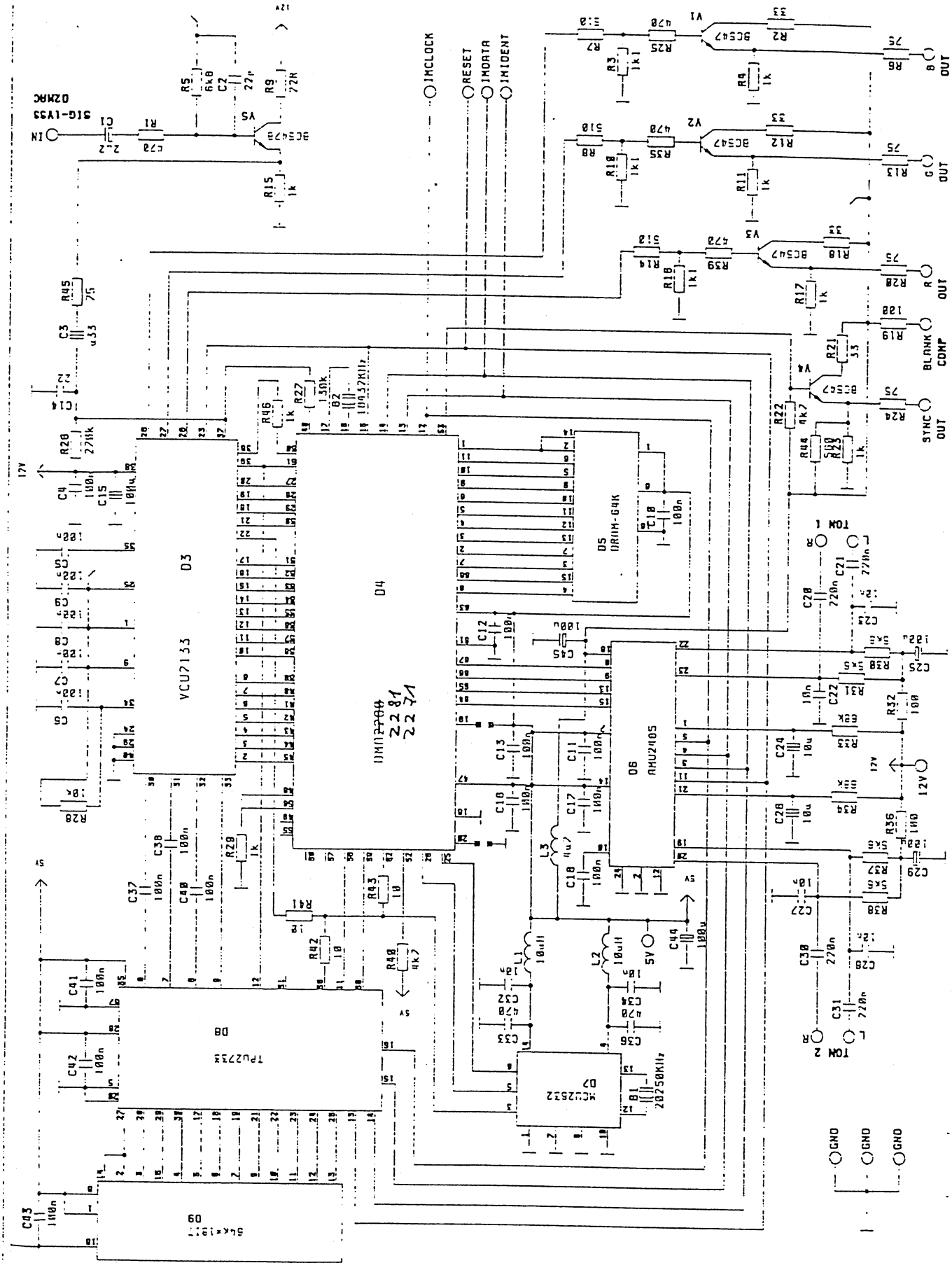
1988	TAG	NAME	KATHREIN ANTENNEN · ELECTRONIC COMMUNICATIONS-ANLAGEN POSTFACH 260 D-8200 ROSENHEIM 2 TEL. 08031/184-0	MFK 85	BEZ.: VIDEOTEXT-DECODER BG-NR: 136.2947 LP-NR: 036.2946	VT85-D
BEARB.	01.07.	A.L.				BLATT 1
GEPR.						
GEAND.						
INDEX						

INSTRUCTIONS FOR ALIGNMENT OF VIDEOTEXT BOARD

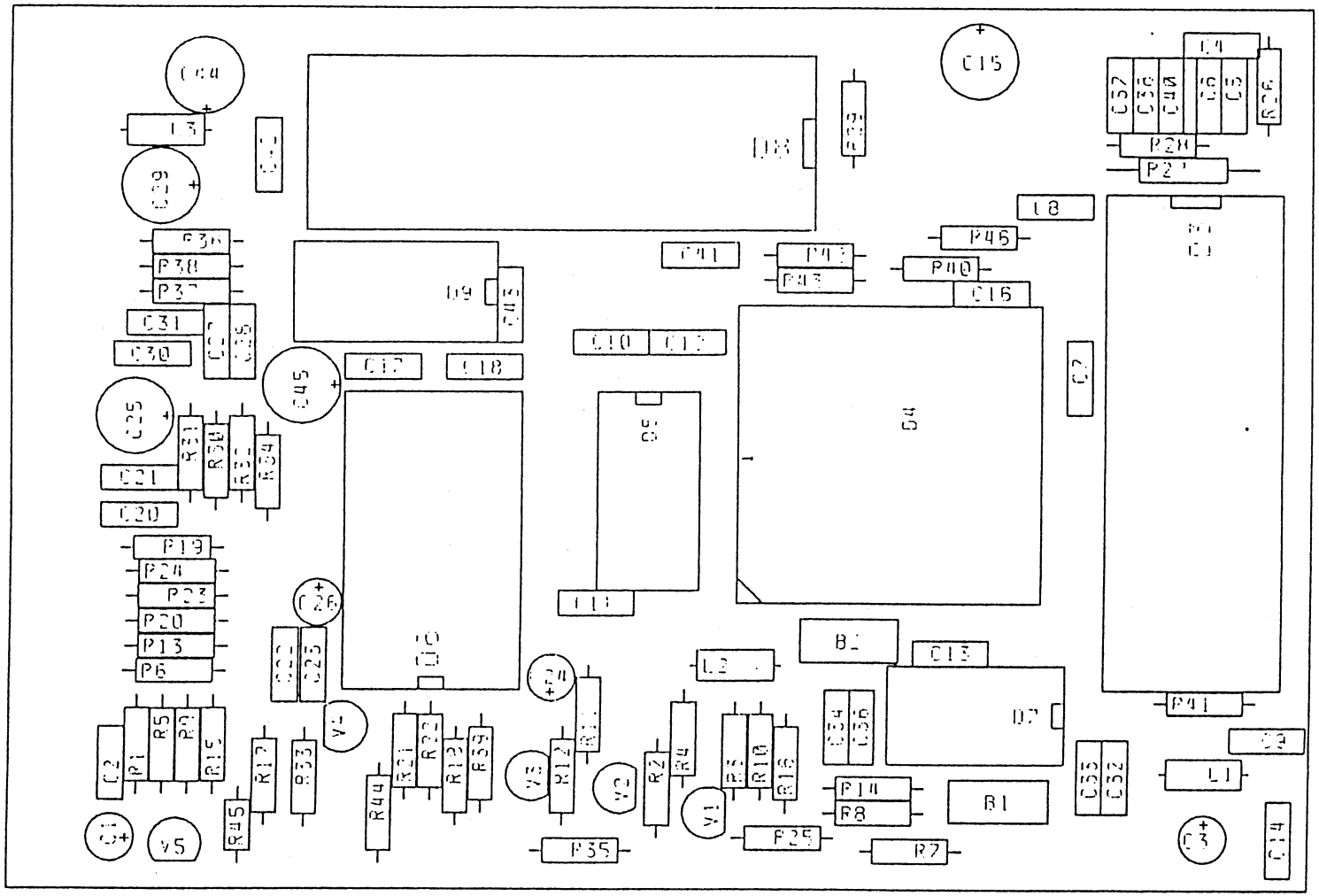
Matching Adjustment:
1. Display videotext picture.
2. Connect test prope of oscilloscope to contact 32 of the videotext module.
3. Set CCVS-signal to minimum, with adjustment control R1.

Mix operation:
1. Press the key "MIX".
2. Decrease input signal with an external attenuater, so that picture is not synchronized.
3. Adjust trimmer C14 for stationary picture.





ISS	TAG	NAME	KATHREIN ANTENNEN · ELECTRONIC COMMUNICATIONS-ANLAGEN POSTFACH 760 D-8200 ROSENHEIM 2 TEL. 08031/184-0	MFK 85	DZMAC-D
BEARB.	02.84.	OSTERM.		BEZ.: D2-MAC DECODER	
GEPR.				BG-NR: 136.2976	
GEZND.				-P-NR: 036.2975	BLATT 1
INDEX 1	7/11/92	4/13/92			

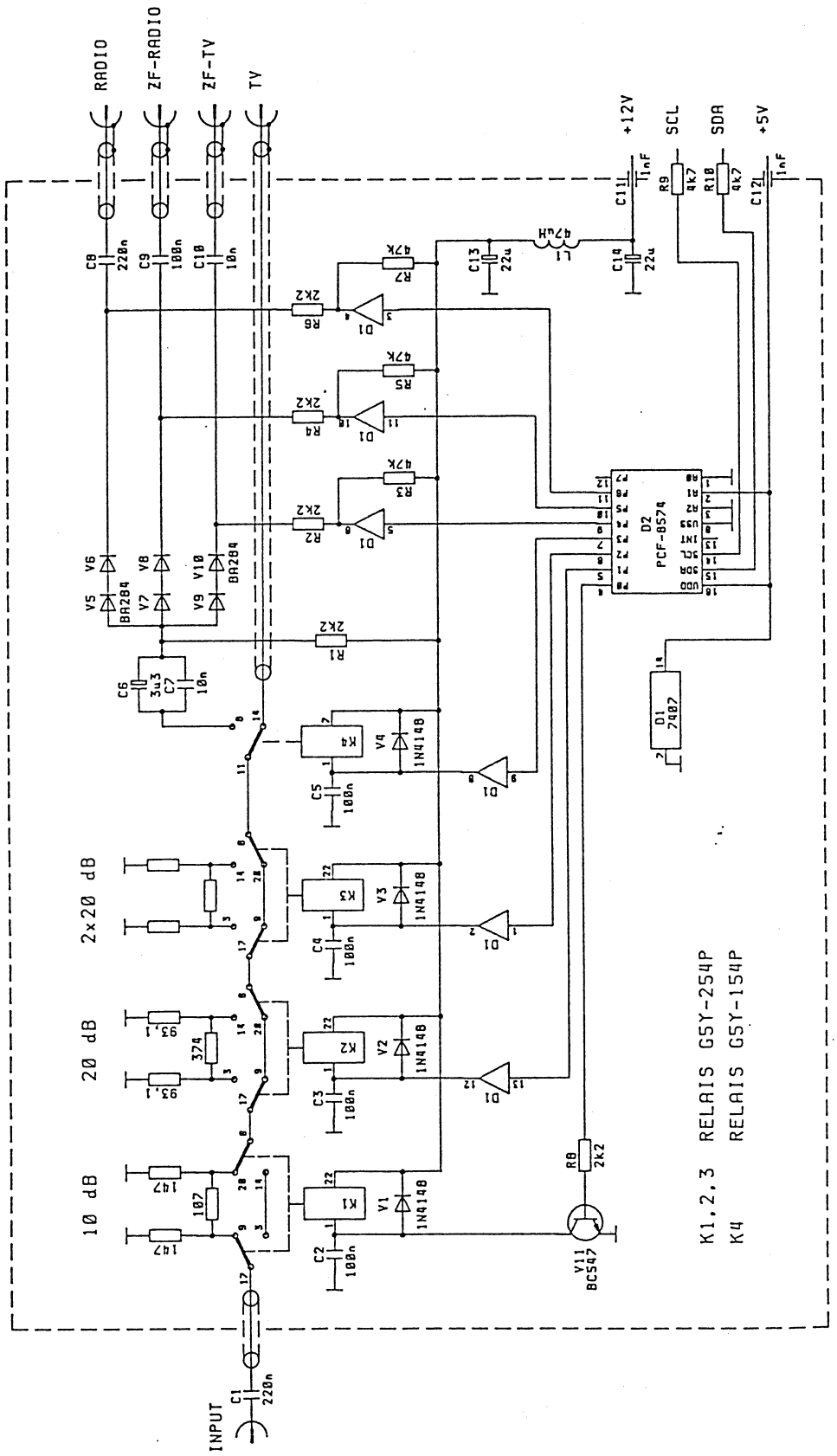


			BESTUECKUNGSPLAN
BEARB.	02.90	OSTERH.	
GEPR.			
		1717/92	

BEZ.	D2MAC-DECODER
BAU-NR.	036.2975
BG-NR.	136.2976

KATHREIN

MASSTAB	BLATT
1,52	6



21 FEB 1999

1989	TAG	NAME
BEARB.	21.02.	LA
GEPR.		
GEÄND.		
INDEX		

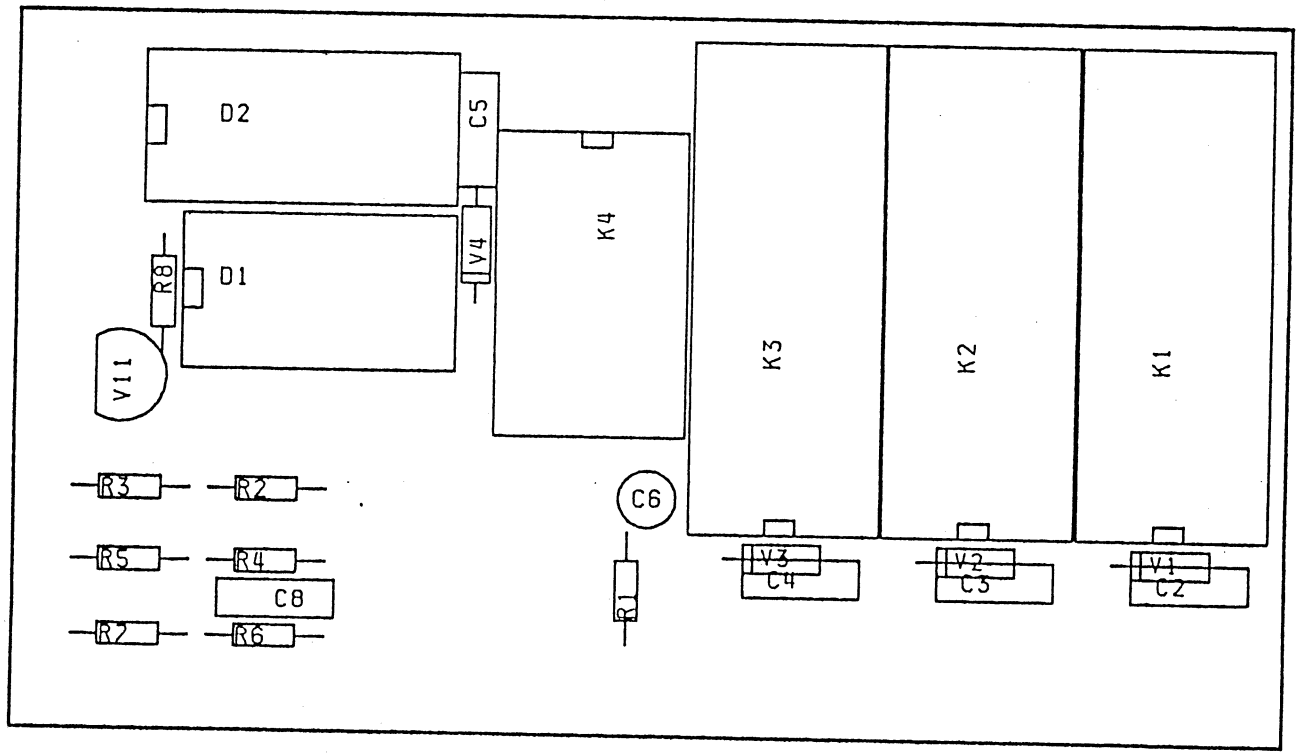
KATHREIN
ANTENNEN · ELECTRONIC
COMMUNICATIONS-ANLAGEN
POSTFACH 260 D-8200 ROSENHEIM 2
TEL. 08031/184-0

MFK 85

RF-ATTENUATOR R

HFT-D

BLATT 1



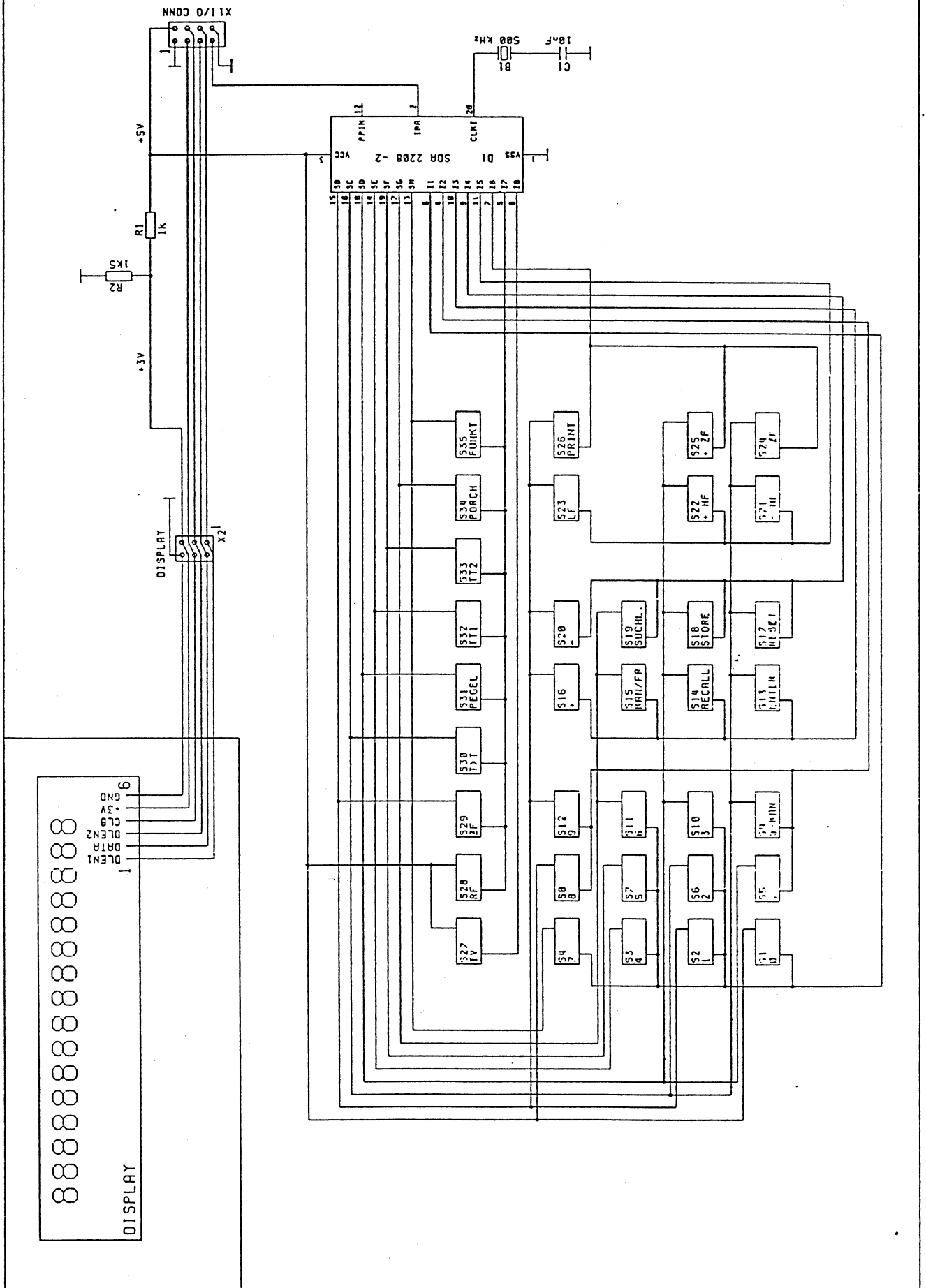
1989	DATUM	NAME
BEARB.	89.03.	LA
GEPR.		

BESTUECKUNGSPLAN (BAUTEILS.)

RF-ATTENUATOR

KATEK GI
BAHNHOFSTR.
D-8217 GRAS

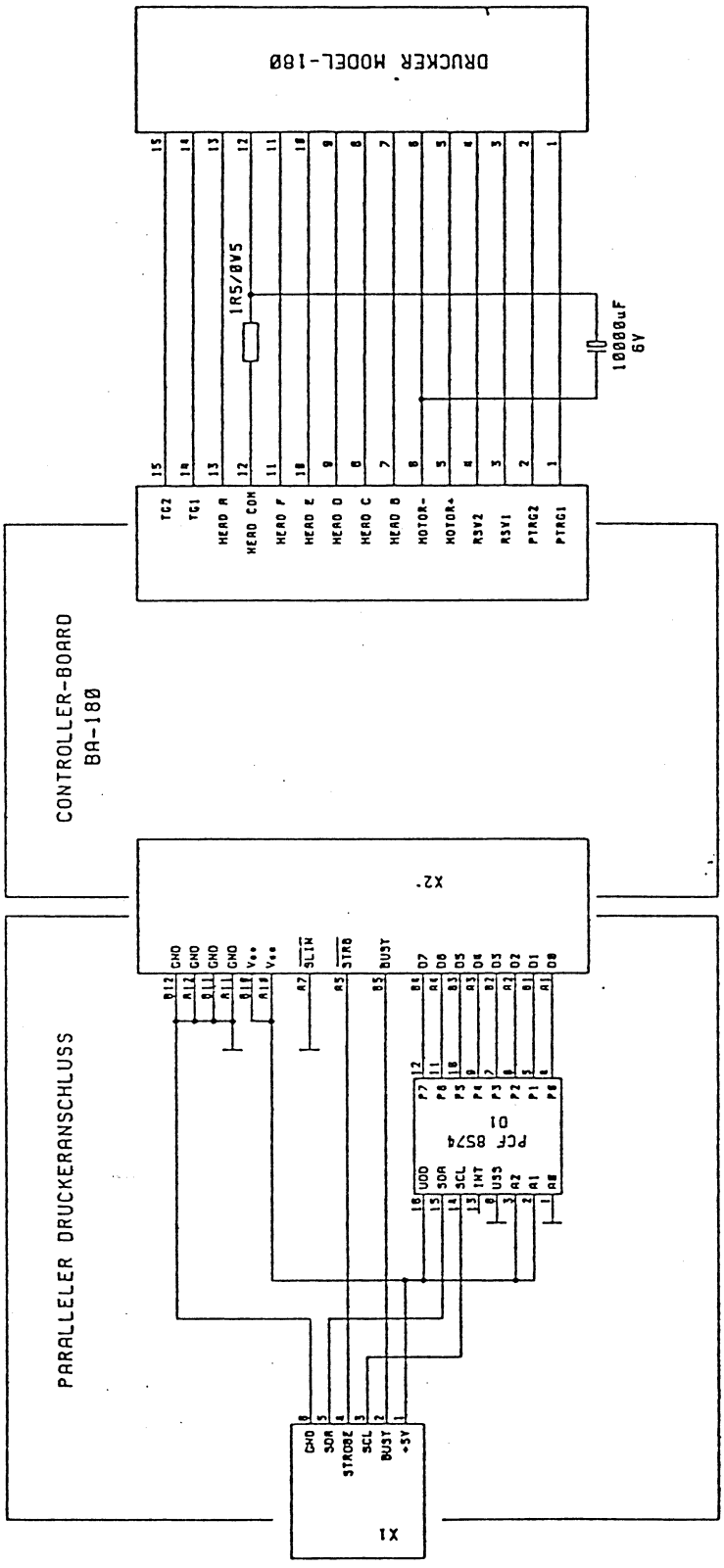
MASSTAB	BLA
2:1	6



1989	TAG	NAME	KATHREIN	MFK 85	KEY-BOARD	KEY85A-D
BEARB.	06.11.	A.L.	ANTENNEN · ELECTRONIC COMMUNICATIONS-ANLAGEN POSTFACH 260 D-8200 ROSENHEIM 2 TEL. 08031/184-0			BLATT 1
AEND.	1409/89	A.L.				

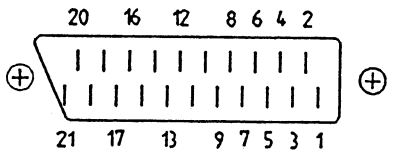
KEY85A

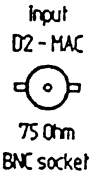
1989	DATUM	NAME	BESTUECKUNGSPLAN BAUTEILSEITE	KEY-BOARD	KATEK GMBH BAHNHOFSTR. 108 O-8217 GRASSAU
BEARB.	06.11.	A.L.			
INDEX	A	1409/89			MASSTAB 1,52 / BLATT 6



1989	TAG	NAME	KATHREIN ANTENNEN · ELECTRONIC COMMUNICATIONS-ANLAGEN POSTFACH 266 D-8200 ROSENHEIM 2 TEL. 08031/184-0	MFK 85	PARAL. PRINTER .. DAP-D
BEARB.	07.03.	LA			BLATT 1
GEPR.					
GEAND.					
INDEX					

External connection possibilities





Euro norm socket

2	audio input R	
4	audio earth	internal connected = mono
6	audio input L	Ri = 10 kOhm 0,5 V

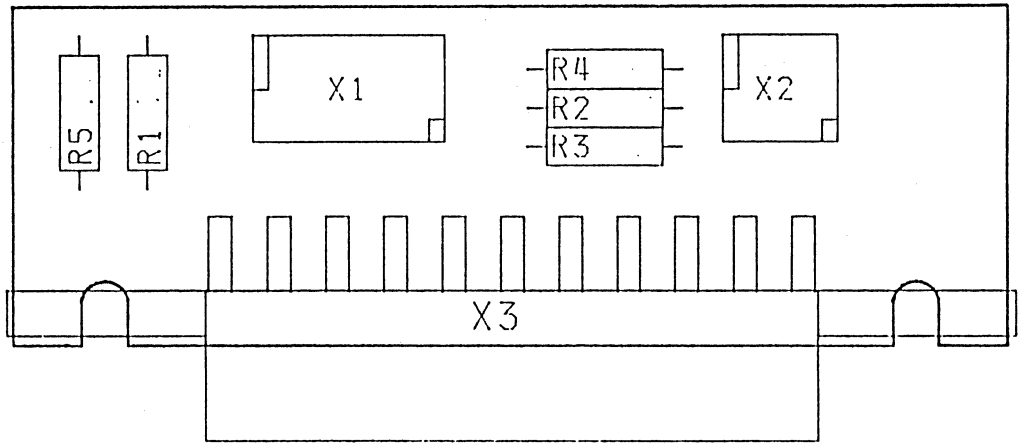
5	blue earth		
7	blue input 0,7 V	RL = 75 Ohm	For external RGB operation
9	green earth		with the Euro norm socket
11	green input 0,7V	RL = 75 Ohm	1V must be applied to the
13	red earth 0,7 V	RL = 75 Ohm	pin 16 and the function F7
15	red input 0,7 V	RL = 75 Ohm	entered.
16	blank input 0,7 V	RL = 75 Ohm	The synchro signal must be connected to Pin 20 of the Euro norm socket

8	Switching voltage video input (12 V) - output (0V) or function F7 activates the Comp. Col. Signal input
17	video earth
19	video output FBAS ca 1 Vpp to 75 Ohm
20	video input FBAS 1 Vpp RL = 75 Ohm

21 earth = connector screening

Stereo head phone output (3,5 mm jack socket)

On radio operation mono/stereo
On TV operation SC1 tone 1 left
On TV operation SC2 tone 2 right



SCART-L

1988	DATUM	NAME
BEARB.	10.88.	KOLLER
GEPR.		

BESTUECKUNGSPLAN

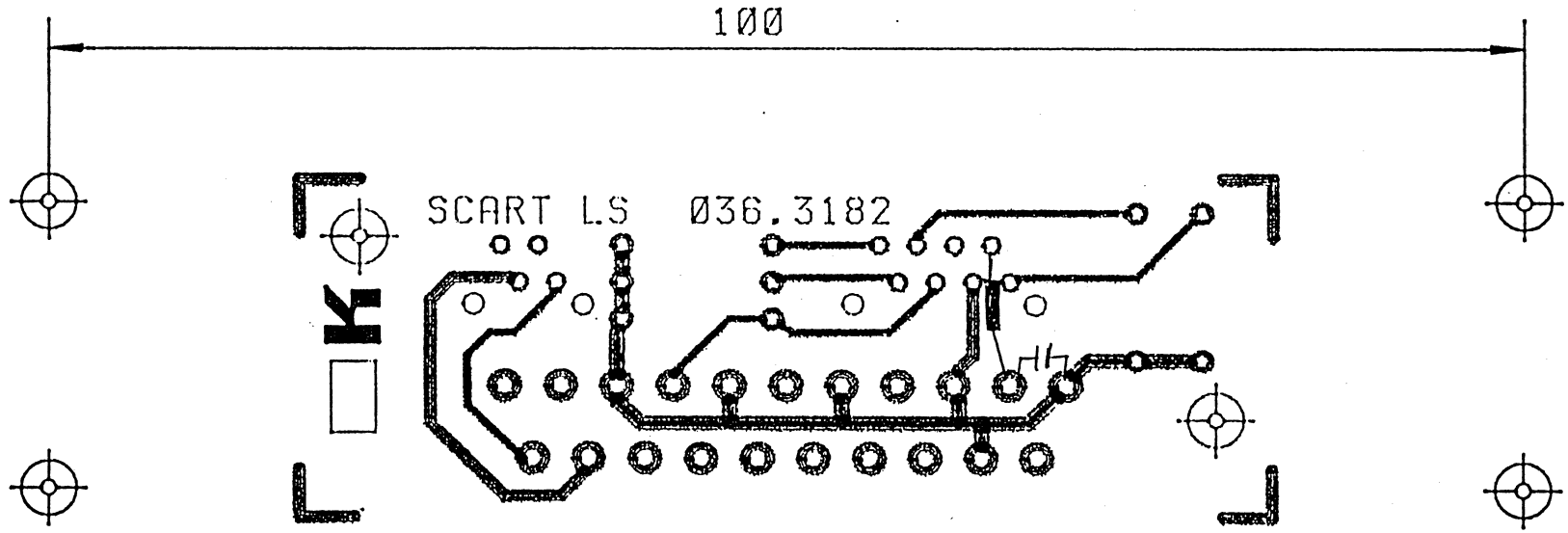
BEZ. SCARTANSCHLUSSPLATINE

MAT-NR. Ø36.3182

BG-NR. 136.3183

KATEK GMB
BAHNHOFSTR.10
D-8217 GRASSA

MASSTAB	BLATT
2:1	6



IHR FIRMENZEICHEN

SCART-L

1988	DATUM	NAME
BEARB.	10.88.	KOLLER
GEPR.		

ÄETZBILD LEITERSEITE

OBERFL.:
HAL SN/PB 1...5
KUPFER

BEZ.	SCARTANSCHLUSSPLATINE
MAT-NR.	036.3182
BG-NR.	136.3183

KATEK GMBH
BAHNHOFSTR.108
D-8217 GRASSAU

MASSTAB	BLATT
2:1	2

M O D U L E - O R D E R - N U M B E R S

MFK 85

Bau-Nr.	Type	Menü	Module: Ton-ZF	ZF-Video	Drucker	Grafik	VT	RS 232	D2-MAC	AZV	Prozessor	Tuner	Pal-Secam	
208207	mit Option (VT)	D	167599	16700013	16700029	16700036	167589	167636		167586	167587	167583	167590	1
208208	Post mit Option (VT)	D		"										
208209	Post mit Option (VT; D2-MAC; RS 232)	D	"	16700016				"	167588					
208211	Frankreich mit Option (VT)	F		"				"				"		
208212	System I mit Option (VT) 6 MHz	E	167635	16700013										
208213	OIRT mit Option (VT)	E	167637	16700043				167636						
208225	mit Option (VT)	E	167599	16700013			"							
208226	Frankreich mit Option (D2-MAC; RS232)	F		16700016	"	"			"	"	"	167600	"	
208227	50 Ω - BNC ohne Option	D		16700013								167583		
208229	Norwegen mit Option (RS-232; BNC-Eingang)	E												
208232	Spanien mit Option (VT; D2-MAC; RS-232; 50 Ω-BNC)	E						"	"					
208235	wie 208209 (nicht für die Post)	D	"	"					"			"		
208236	Norwegen mit Option (RS-232; Nicam; BNC-75 Ω Eingang)	E												
208239	Frankreich mit Option (D2-MAC; RS-232)	D		16700016			167589		"			167600		
208246	mit Option (VT; RS-232; 75 Ω BNC-Eingang)	D		16700013			"					167583		
208247	mit Option (VT; D2-MAC; RS-232; 75 Ω BNC-Eingang)	D		"			"		"			"		

LIST OF SPARE PARTS MFK 85

Module		167 583	Tuner
		167 600	Tuner, France
Pos.-Nr.	V7,V8,V11...V20	905 270	BA 244
	V9	905 295	BF 959
	N1	905 436	IC SDA 3202
	V3..V6	905 586	Trans BC 328-40
	B1	907 2995	Quartz 3,2 MHz

Module		168 1012	RF-Attenuator
Pos.-Nr.	K1...K3	991 417	Relais G5Y-254P 12V DC
	K4	991 418	Relais G5Y-154P 12V DC
	V5...V10	905 664	BA 284
	D1	905 1047	IC-SN 7407
	D2	905 1054	IC-PCF 8574P

Module		136 2943	Line + Field Timebase Boar
Pos.-Nr.	L4	991 440	MPA 881 222
	T2	193 410	FAT 3838
	C25	900 7379	4,7µF 100V-MKC4 RM27,5
	C26	900 7381	1,5µF 63V-MKC RM15
	N1	905 1070	IC UC 3843
	N4	905 1071	IC NE 555
	N2	905 1072	IC TDA 1950
	N3	905 1073	IC TDA 8176
	V1,V13,V14,V16	905 504	SI-BYV 95B
	V5	905 585	BYS 26
	V22	905 758	BSTC-1046
	V11	905 758	P475
	V4	905 759	P362

Module		167 586	Measurement-Amplifier
Pos.-Nr.	Z1,Z2	991 437	Quartzfilter 10M7B
	Z3,Z4	991 438	Ceramicfilter SFE 10,7MS2
	D1,D2	905 1054	IC-PCF 8574P
	V31	905 162	Z-BZX 79 C4V7
	N1	905 222	IC S042P UKW-Mixer
	V4...V21	905 270	BA 244
	V1..V3,V22..V27	905 295	BF 959
	D3	905 313	IC HEF 4011B
	N2,N3	905 320	IC LM 324
	V28	905 575	Diode BAS 70-02

Module		167 000 13	IF-Video/BG-L-RSB
		167 000 05	IF-Video Norwegean
		167 000 43	IF-Video OIRT
		167 000 16	IF-Video France
Pos.-Nr.	L8,L9	991 327	Filter 5,5 MHz P119ANS-434
	L4,L10	991 901	Filter 113KNS-K1762 HM
	L5,L6	991 902	Filter 113 KNAS-2K813 AKE
	Z1	991 903	OFW Filter L 9350
	Z2	991 904	OFW Filter G3251 38.9MHz
	Z3	991 905	OFW Filter F4955 12MHz
	V8,V20	905 9901	BAL 74
	V5,V6,V22	905 9902	BAV 99
	V13,V14,V2,V1,V21	905 9903	BC 847B
	V3,V4,V19,V11,V12,V18	905 9904	BC 857B
	V7,V15..V17,V10,V9	905 9905	BF 799
	N2	905 1025	IC TDA 5930
		905 9906	IC TDA 4445A

Module		167 636	RS232-Interface
Pos.-Nr.	X4	991 473	D-Sub 25pol Socket
	D1	905 9910	IC MAX 232

Module		136 3010	Signal-Board
Module		136 3012	Decoder Board
Pos.-Nr.	D2	905 1054	IC-PCF 8574P
	N3,N2	905 1055	IC-HEF 4052BP
	D1	905 1084	IC SAA 7400
	N1	905 465	IC HEF 4053 B
Module		167 599	Sound-IF-Board
		167 635	Sound-IF-Board England
		167 637	Sound-IF Board OIRT
		167 000 40	Sound-IF-Board Norwegian
Pos.-Nr.	Z1	991 020	IF-Eingangsfilter SFE5,74
	Z3	991 021	IF-Discrim. CDA 5.74MC10
	N3...N5	905 1074	IC TCA 830SM
	V12,V13	905 270	BA 244
	N1,N2	905 336	IC TBA 120 T
Module		136 3183	Scart-Socket
Module		991 463	Euro-AV-Socket
Module		167 000 29	Control Board BA 180
Module		991 040	Bulb 12V/25mA

Module		167 588	D2 MAC Decoder
Pos.-Nr.	D5	905 1060	IC 51C64-12
	D6	905 1061	IC AMU 2485
	D3	905 1062	IC VCU 2133
	D7	905 1063	IC MCU 2632
	D4	905 1064	IC DMA 2280
	B1	907 2997	Quartz 20.25 MHz
	B2	907 2998	Quartz 18.432 MHz

Module		136 2974	Key Board

Module		167 587	Microcomputer
Pos.-Nr.	D1	905 1045	IC-SAB 80C535-N
	D7,D8	905 1046	IC SDA 2526
	D2	905 1048	IC 74HCT138
	D5	905 1049	IC 27C256/250
	D3	905 1050	IC 74HCT373
	D4	905 1051	IC NEC D446C
	N1	905 1052	IC LM 336Z/2,5V
	D6	905 1441	IC TL 7705
	B1	907 2976	Quartz 12MHz

Module		167 023	Radio-IF-Board
Pos.-Nr.	Z2	991 052	TOKO-Filter TKXCS-33733 BS
	Z1	099 957	Filter 85AC-3000 10.7 MHz
	Z3	099 958	Filter 85ANS-1715BM 10.7MHz
	B2	198 994	Keramik-Filter 455 KHz
	N1	905 1038	IC TDA 4210-3
	D1	905 1039	IC SDA 2121
	N3	905 222	IC S042P UKW-Mischer
	V5,V6	905 270	BA 244
	V3	905 295	BF 959
	N5	905 400	IC LM 78L05AC2
	N2	905 412	IC TCA 4510
	N4	905 414	IC TDA 2048
	V8	905 587	BC 517
	V2	905 590	BF 939
	V11	905 591	T1-N 5221 B C2V4 05W
	V21,V22	905 760	BZX 79/C10
	B3	907 901	Quartz 4,0MHz
	B1	907 2978	Quartz 10,245MHz

Module		136 3010	Signal-Board
Module		136 3012	Decoder Board
Pos.-Nr.	D2	905 1054	IC-PCF 8574P
	N3,N2	905 1055	IC-HEF 4052BP
	D1	905 1084	IC SAA 7400
	N1	905 465	IC HEF 4053 B
Module		167 599	Sound-IF-Board
		167 635	Sound-IF-Board England
		167 637	Sound-IF Board OIRT
		167 000 40	Sound-IF-Board Norway
Pos.-Nr.	Z1	991 020	IF-Eingangsfilter SFE5,74
	Z3	991 021	IF-Discrim. CDA 5.74MC10
	N3...N5	905 1074	IC TCA 830SM
	V12,V13	905 270	BA 244
	N1,N2	905 336	IC TBA 120 T
Module		136 3183	Scart-Socket
Module		991 463	Euro-AV-Socket
Module		167 000 29	Control Board BA 180
Module		991 040	Bulb 12V/25mA

Module		167 586	Measurement-Amplifier
Pos.-Nr.	Z1,Z2	991 437	Quartzfilter 10M7B
	Z3,Z4	991 438	Ceramicfilter SFE 10,7MS2
	D1,D2	905 1054	IC-PCF 8574P
	V31	905 162	Z-BZX 79 C4V7
	N1	905 222	IC S042P UKW-Mixer
	V4...V21	905 270	BA 244
	V1..V3,V22..V27	905 295	BF 959
	D3	905 313	IC HEF 4011B
	N2,N3	905 320	IC LM 324
	V28	905 575	Diode BAS 70-02

Module		167 000 13	IF-Video/BG-L-RSB
		167 000 05	IF-Video Norway
		167 000 43	IF-Video OIRT
		167 000 16	IF-Video France
Pos.-Nr.	L8,L9	991 327	Filter 5,5 MHz P119ANS-434
	L4,L10	991 901	Filter 113KNS-K1762 HM
	L5,L6	991 902	Filter 113 KNAS-2K813 AKE
	Z1	991 903	OFW Filter L 9350
	Z2	991 904	OFW Filter G3251 38.9MHz
	Z3	991 905	OFW Filter F4955 12MHz
	V8,V20	905 9901	BAL 74
	V5,V6,V22	905 9902	BAV 99
	V13,V14,V2,V1,V21	905 9903	BC 847B
	V3,V4,V19,V11,V12,V18	905 9904	BC 857B
	V7,V15..V17,V10,V9	905 9905	BF 799
	N2	905 1025	IC TDA 5930
		905 9906	IC TDA 4445A

Module		167 636	RS232-Interface
Pos.-Nr.	X4	991 473	D-Sub 25pol Socket
	D1	905 9910	IC MAX 232

Module		136 3285	Voltage-Doubler
Pos.-Nr.	V1...V4	905 504	SI-BYV 95B
	C1...C4	900 471	10n 400V MKS4
Module		167 000 36	Grafic-Controler CRT
Module		168 331	Power-Supply-Board
Pos.-Nr.	V1	093 702	Rectifier
	K1	991 084	Relais DC 9V
	S1	991 134	Switch
	L4	991 475	Coil
	T1	193 396	Transformator
	V4	905 136	BZ102 1V4
	V9	905 166	BZX 79 C6V8
	N1	905 393	IC L200 CH
	N2	905 478	IC-LT 1070CT
	V5	905 504	SI-BYV 95B
	V11,V12	905 585	BYS 26
	V6	900 7165	1000n 100V MKT
Module		167 590	PAL-Secam-Decoder
Pos.-Nr.	L9	991 434	Delay-Line 470
		991 435	Delay-Line 711
	N1	905 1059	IC TDA 4556
	N3	905 1065	IC TDA 3506
	N2	905 1066	IC TDA 5850
	V5	905 262	Diode Z BZX79 C6V6
	V6,V9,V11,V14,V16,V19	905 752	BF 422
	V10,V15,V20	905 751	BF 423
	B1	907 2996	Quartz 8,867238MHz
Housing Parts		**168 000 82**	**Carrying Handle**
		072 821	**Printer-Ribbon**
		072 822	**Printer-Paper**
		110 000 01	**Standing Feet Right**
		110 000 02	**Standing Feet Left**